Thermo Nicolet

OMNIC®

Atlμs™ User's Guide

Version 2.5

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Contents

1 Introduction

This manual explains how to use your OMNIC® Atlμs™ Microscope Software to perform automated data collection and spectral mapping experiments with your microspectrometer system. You can automatically collect different types of compositional maps, as well as spectra at discrete points, and display the collected data in a variety of formats. You can also create reports containing map data and print contour maps, waterfall and 3-D displays, and comprehensive video images of the sample.

Before you begin working with the software, read the overview of automated data collection provided in Chapter 2, which describes the main steps of performing an experiment. Then refer to the remaining chapters as you use the software. They describe in detail how to use the special windows and menu commands to collect and manipulate mapping data.

This manual covers only those features that are unique to the OMNIC Atlμs software. For information on using standard OMNIC features, see the OMNIC on-line Help system. For detailed information on using your microscope, motorized stage, and video equipment, see the manuals or on-line documentation that came with each product.

Manual conventions

The following conventions are used in this manual to draw your attention to important information:

Note Notes contain helpful supplementary information.

Important Follow instructions labeled “Important” to avoid damaging the system hardware or losing data.

Caution Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.

⚠ Warning Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

⚠ Danger Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

How to This symbol indicates the beginning of a step-by-step procedure.

Tips This symbol marks the start of a list of helpful tips for using the feature being discussed.

line map A series of spectra collected at points evenly spaced along a straight line on a sample. The map is a record of the changes in the chemical composition of the sample along the mapped line.

Where appropriate, we define key terms in a gray box like the one shown at left.

What you need to run OMNIC Atlμs

To run OMNIC Atlμs, your system must meet the following requirements:

- Intel® Pentium® II processor with 233 MHz clock speed.
- 64 megabytes of random access memory (RAM).
- Hard disk size of 2.0 gigabytes.
- Quad speed CD-ROM drive.
- 4 megabytes of video RAM.
- 1.44-megabyte floppy disk drive for 3.5-inch floppy disks.
- 15-inch SVGA monitor with 800-by-600 resolution.
- Keyboard and serial or bus mouse or PS/2®-style mouse.
- Three available PCI slots.
- Optical bench interface card and/or cable (if you plan to collect data).
- Thermo Spectra-Tech motorized stage and controller with serial cable.
- An available serial port for connecting to the motorized stage.
- An additional serial port if you have the autofocus option on any microscope other than a Continuμm™.
- One ECP bidirectional parallel port if you have an Avatar®.
- Windows® 98, Windows Me, Windows NT® 4.0 or Windows 2000.
- OMNIC 5.0 or greater.

The following additional items are required for the video capability:

- An NTSC or PAL camera with composite BNC or S-video connector output. This can be an integrated microscope camera or an external, microscope-compatible camera. An external camera requires a trinocular viewer for mounting it on the microscope.

- Thermo Spectra-Tech Advanced Video Microscopy Package. This package requires a PCI slot.

The software used by your system must be installed in the following order:

1. Windows

2. Thermo Nicolet G-XT™ device drivers software or VG2X™-PCI video image card software

3. OMNIC

4. OMNIC Atlμs

If you did not purchase your computer from Thermo Nicolet, you will need to install the software and hardware. See the installation instructions that came with the software and hardware for complete information.

It is important to remember that the faster the computer, the faster the data processing will be.

About autofocus

The optional autofocus feature lets you focus the microscope automatically using the focus buttons in the Atlμs window. When you initiate focusing with the buttons, the motorized autofocus equipment raises or lowers the stage (along the Z-axis) to bring the view of the sample surface into focus.

Note If you have the autofocus option, leave the Autogain switch (if present) on the video camera turned off unless you are performing a reflection experiment on a highly reflective substrate such as a gold mirror. ▲

Note You can also operate the autofocus equipment by using the provided hardware controller. See the documentation that came with the equipment for more information. ▲

In addition to the focus buttons, several other features become available in OMNIC Atlμs when the autofocus feature is installed:

- Focus Settings appears in the Stage menu (or Continuμm menu) allowing you to specify whether to focus the microscope automatically whenever you move the stage along the X-axis or Y-axis. See “Focusing the microscope automatically after moving the stage” in the “Atlμs Window Menus” chapter for details.

- In the Stage Serial Port Selection dialog box—displayed when you choose Set Serial Port from the Stage menu (or Continuμm menu)—options for selecting a serial port for the autofocus equipment become available. See “Selecting serial ports for communication” in the “Atlμs Window Menus” chapter for more information.

- In the Map Setup dialog box (displayed when you choose Map Setup from the Collect menu), the Focus tab becomes available allowing you to specify whether and how to focus the microscope automatically during data collection. See “Focus parameters” in the “Atlμs Window Menus” chapter for details.

Note When OMNIC Atlμs starts, it checks to see if the Z-axis of the microscope has been initialized. If the axis has not been initialized, you are asked whether to initialize it. See the next section for complete information. ▲

Tips for using autofocus

Autofocus operates by optimizing video image contrast as it moves the stage up and down. The maximum distance moved in either direction is 1.0 mm. If the system does not detect an optimum video image contrast, the software informs you that autofocus has failed. If you are performing a mapping experiment, the microscope continues to collect the map even if autofocus has failed.

There are a number of things you can do to improve the system's autofocus performance and avoid failures:

- Bring the sample's vertical position to within 1.0 mm of correct focus. To do this, view the sample from the side (not through the eyepieces or on the video monitor) and raise or lower the stage to sharply focus the dot of white light hitting the sample surface.

- Adjust the illumination for optimum viewing. You should be able to see contrasting sample features. If the illumination is too high or too low, the autofocus feature will not be able to make use of contrast to optimize the focus.

- For difficult samples, first adjust the aperture so that its opening is completely within the field of view and then use autofocus. The edges of the aperture provide additional contrast that helps the system focus automatically.

Autofocus is generally successful when the above techniques are used. However, there are some notable samples that may still be difficult to focus:

- A sample with a perfectly smooth surface; for example, a new gold mirror. This sample is difficult because it has no sample features. A used gold mirror generally has a few imperfections that increase autofocus success.

- Highly diffuse samples. Samples that have multiple points of focus (paper, powder, etc.) generally cannot be focused automatically.

There are two ways to overcome the limitations of autofocus for samples with poor contrast or with multiple points of focus:

- Use the Use Stored Focus Locations (Discrete Points Only) option to make use of stored focus positions. See "Focus parameters" in the "Atlμs Window Menus" chapter for details.

- Perform the analysis using an ATR objective or crystal slider and the Use Stored ATR Contact Position For All Points option. See "Collecting ATR data with autofocus" in the "Atlμs Window Menus" chapter for more information.

About Z-axis initialization

If you have a Continuμm microscope with the optional automated Reflex™ aperture, you can use OMNIC Atlμs to control stage movement along the Z-axis (up and down). Each time you turn on the microscope power, the Z-axis position of the stage must be initialized. Unlike X-Y initialization, Z-axis initialization is not completely automatic; you must take steps to protect the microscope hardware.

Follow these steps to initialize the Z-axis:

1. **Lower the condenser all the way and remove the nosepiece from the microscope.**

2. **Turn on the Continuμm microscope power.**

Important To prevent damage to the microscope, make sure the condenser has been lowered all the way and the nosepiece has been removed from the microscope before initialization begins, as explained in the next step. Do *not* press F10 before lowering the condenser and removing the nosepiece. ▲

3. **Start OMNIC Atlμs.**

   When initialization begins, a message asks you to move objectives and other components so that they are clear of the stage.

4. **Press the F10 function key on the keyboard to continue, or press the Esc key to cancel the initialization.**

   - If you press the F10 key to initialize the Z-axis, the stage moves to its upper and lower limits and then back to the origin. The initialization takes a minute or two; a message is displayed until the process is complete. After initialization, the stage returns to its former position.

   - If you press the Esc key to cancel the initialization, a message informs you that all automation involving control of movement along the Z-axis has been disabled. This includes auto ATR contact, software control of Z-axis movement, and autofocus. Choose OK. If you want to use these features later, you must restart the microscope.

5. **Reinstall the nosepiece.**

Starting OMNIC Atlμs

Follow these steps to start OMNIC Atlμs:

1. **Start Windows.**

2. **Click the Start button on the Windows taskbar and then click Programs. In the Thermo Nicolet folder, click the OMNIC program.**

   The OMNIC window appears with the Atlμs menu present in the menu bar. You can now define and collect a new map by using Show Atlμs Window in the Atlμs menu or open a stored map by using Open Map. See “Displaying the Atlμs window” or “Opening a map” in the “Atlμs Menu Commands” chapter for details.

   For information on other methods of starting applications and more detailed instructions on using Windows features, see your Windows documentation.

On-line Help

To see Help information about the unique Atlμs features, choose Contents from the Help menu of the Atlμs window or choose Atlμs Help Topics from the Atlμs menu of the OMNIC window. From the Help window that appears, you can display information about the feature of interest.

You can also use context-sensitive Help to display information:

- To see information about a feature in a map window or in a dialog box for a command in the Atlμs menu of the OMNIC window, click the feature using the right mouse button. A brief description of that feature appears along with a Discussion button or How To button, or both. Click the Discussion button to see a more detailed discussion of the feature or dialog box. Click the How To button to see a step-by-step procedure for using the dialog box.

- To see information about a menu command, click the menu name to display the menu, use the down arrow key to highlight the name of the command, and then press the F1 function key. You can also press F1 when the dialog box or window for a command is displayed.

Note Context-sensitive Help is not available for the Open Sequence File, Save Sequence As, Save As (displayed by Save Video Image in the Image menu) and Save Calibration As dialog boxes. Except for Open Sequence File, these dialog boxes include a Help button that you can click to see specific Help information.

To see information about standard OMNIC features, choose OMNIC Help Topics from the Help menu of the OMNIC window or use context-sensitive Help as explained above.

Exiting the software

To exit OMNIC Atlμs, choose Exit from the File menu of the OMNIC window to close the window. If the Atlμs window is open, close it by choosing Exit from its File menu. You can also close the window by clicking the Close button (labeled “X”) in the upper-right corner.

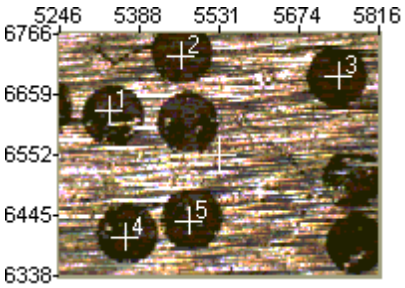
2 Overview

This chapter provides an overview of collecting and working with microspectrometry data. It includes a summary of how to use OMNIC Atlμs to perform automated point-of-interest analyses (at discrete sample points) and compositional mapping experiments.

The software commands mentioned in this chapter are described in detail in later chapters.

Automated point-of-interest analysis

If a sample has one or several areas of interest, you can use OMNIC Atlμs to specify discrete points at which to collect spectra. Examples of this type of sample are scattered contaminants on a metal surface or a polymer film whose uniformity you want to measure. The following example shows several individually specified sample points. The points are labeled with consecutive numbers.



See “Specifying discrete points” in the “The Atlμs Window” chapter for complete information on specifying individual sample points.

ordered array A set of discrete points whose locations correspond to regularly spaced samples.

You can also collect spectra of individual samples positioned in an ordered array, such as samples regularly spaced on a microscope slide. See “Specifying an ordered array” in the “The Atlμs Window” chapter for details.

Even the most routine analysis of a single point of interest requires a sample point and a reference or background area for a ratioed spectrum. OMNIC Atlμs lets you easily specify these points by using the mouse or entering coordinates. The points you specify are labeled with consecutive numbers.

When you collect data at discrete sample points, including those in an ordered array, the collected spectra are displayed in a standard spectral window.

Introduction to mapping

Compositional mapping in infrared and Raman microspectroscopy is a powerful analytical technique. By obtaining a series of spectra over a sample area, you can record the changes in the chemical composition of a sample and relate them to the visible image. Often, mapping is the only way that such detailed information can be obtained.

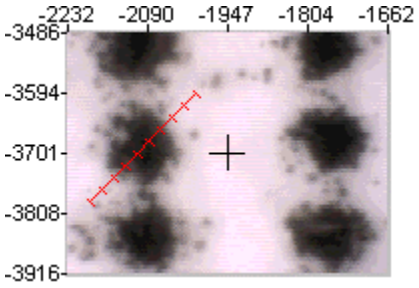
Mapping allows you to collect a large number of spectra quickly and automatically. By linking the parts of the mapping system—the microscope, the motorized stage, the video image, the operating software and the graphics software—OMNIC Atlμs lets you efficiently analyze complex, microspectroscopic-size samples.

The two kinds of maps

You can use OMNIC Atlμs to collect two different types of maps: line maps and area maps. (You can also collect data at discrete sample points, including discrete points in an ordered array. See "Automated point-of-interest analysis.")

line map A series of spectra collected at points evenly spaced along a straight line on a sample. The map is a record of the chemical composition of the sample along the mapped line.

A line map consists of a series of spectra collected at sample points evenly spaced along a straight line on the sample. The following example shows the locations of the sample points for a line map.



The sample points are indicated by the tick marks on the line.

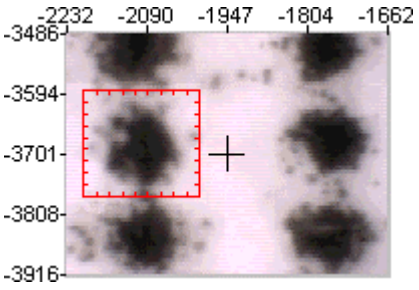
Line maps are useful for profiling across a boundary, such as a diffusion gradient of a solvent migrating across a polymer.

See “Setting up data collection” in the “Atlµs Window Menus chapter” or “Drawing a line map and specifying a background point” in the “The Atlµs Window” chapter for complete information on specifying a line map.

Note You can extract a line map from a collected area map. See “Extracting a line map from an area map” in the “Atlµs Menu Commands” chapter for details.

area map A series of spectra collected at points within a rectangular array on a sample. The map is a record of the chemical composition of the sample within the mapped area.

An area map is a series of spectra collected at sample points within a rectangular array. Here is an example showing the locations of the sample points for an area map.



The tick marks on the rectangle indicate the positions of the rows and columns of sample points. If a grid of horizontal and vertical lines were drawn connecting the tick marks, the sample points would be at the intersections of the lines.

Area maps are most useful for compositional mapping of a discrete artifact within a sample, such as an inclusion in a film.

map sequence Your specification of where on the sample to collect spectra for a map or point-of-interest analysis and the data collection parameter settings.

After you choose a map type, the next step in a mapping experiment is to define the area to be mapped (including the background location) and set the data collection parameters. The map information is called a sequence. You can save a sequence in a sequence file that can be opened later and used for other samples.

After the sequence is defined, you can collect the map. The software lets you display the collected data in several different ways, depending on what information about the sample is of interest. You can view a line map as a "waterfall," a three-dimensional display with the map spectra presented in consecutive order. You can display a line map or an area map as a contour map in a map window, with colors representing different spectral intensities. You can also display individual spectra from these maps in the spectral display pane in the window.

See "Setting up data collection" in the "Atlμs Window Menus chapter" or "Drawing an area map (or Mosaic) and specifying a background point" in the "The Atlμs Window" chapter for complete information on specifying a line map.

The importance of sample focus

One of the most important steps in any microspectroscopy experiment is properly presenting the sample to the microscope. For mapping experiments it is very important that the sample be level over the entire mapping region. If the sample is not level, the focus will change as the microscope stage moves different areas of the sample into the path of the apertured beam. The spectra collected from areas that are not in focus could lead to baseline drifts, loss of spatial resolution and decreased signal-to-noise ratios.

Therefore, the first step in setting up a mapping experiment is to ensure that the sample is level on the microscope stage. If you cannot make the sample level over the entire mapping region, it will be necessary to refocus the stage before each spectrum is collected during the experiment. You can use the Options tab in the Map Setup dialog box to set the software to pause before collecting each spectrum so that you can adjust the focus. If you have the optional autofocus feature, you can use the Focus tab in the Map Setup dialog box to specify that the microscope be focused automatically before collecting each sample spectrum. See "Focus" in the "Atlμs Window Menus" chapter for details.

What is calibration?

calibrate To measure and then specify the distance between points on a video image to serve as a reference for accurate movement of the stage or measurement of sample features.

When you use a video camera with a microscope, the magnification and field of view displayed on the video screen are different from what you see through the microscope eyepiece. When you change the microscope objective, the dimensions of the video system's field of view change. Because the video image is directly related to the stage position and sample size, there must be a way to tell the software the new size, in micrometers, of the video system's field of view so that the map can be defined correctly. This is known as calibrating the video image.

Your software provides a way to create and save calibration files for your different objectives. This allows you to retrieve the appropriate video calibration when you change the objective, rather than having to recalibrate the video image.

The first time you use the software, you are prompted to create a new calibration file. Once a calibration file has been created, the calibration file used as the default when you start the software will be the last file used the last time the software was run.

Note Whenever there is no current calibration file for the video image, you can do any of the following:

- Use Open Calibration in the Image menu to open a calibration file.
- Use Create Calibration in the Image menu to calibrate the video image.
- Continue without using the video pane. You will still be able to specify a map sequence using Map Setup in the Collect menu and the palette tools.

See "Calibrating the video image" in the "Atlμs Window Menus" chapter for complete information on creating and saving a calibration file. See "Opening a calibration file" in that chapter for details on opening a stored calibration.

Collecting backgrounds

background A single-beam spectrum collected with a background material, rather than the sample material, in the beam path. Ratioing a single-beam sample spectrum against the background produces a final sample spectrum.

One or more background spectra are normally needed when you perform an infrared mapping experiment. It is very important that the background for a map be collected at the proper location. The background spectrum should not show any infrared absorptions but effectively compensate for any instrumental responses. A list of suggested background materials is provided in the section called "Collecting a background" in the "Atlμs Window Menus" chapter.

There are three ways you can handle background data collection; these are described in the next sections.

For information on specifying background points and collecting backgrounds, see "Using the tool palette" in the "The Atlμs Window" chapter and "Collecting a background" in the "Atlμs Window Menus" chapter.

Using a different sample for the background

If your sample does not have a reference area suitable for collecting a background, you can collect one using a different material before setting up the sample for data collection. An example of this situation is a reflection-absorption experiment in which a background spectrum is collected using a separate mirror. The map will be ratioed against the last background you collected using the features provided by the Atlμs window (not standard OMNIC).

Important Background points remain defined in the map even after you have collected the background, so if the background point is on another sample, use Clear in the Edit menu of the Atlμs window before defining your new map. Since the background was collected from another sample, the Collect Background Every __ Spectra option (described later in the "Collecting more than one background" section) will not be available. ▲

Collecting a background before the map spectra

If your sample has a suitable reference area, you can specify a point at which a background will be collected before the map spectra. All the map spectra will be ratioed against this background spectrum.

Collecting a new background during an experiment

There may be times in a mapping experiment when you want to collect a new background spectrum. This is an important option if you are concerned about atmospheric changes or are performing a long experiment. If there is a reference area on your sample for a background point, you can use the Collect Background Every __ Spectra option to specify that new backgrounds be collected at that point during the course of the experiment. All the map spectra collected will be ratioed against the last background spectrum collected. You can specify how many sample spectra to collect before a new background is collected. See "Options" in the "Atlμs Window Menus" chapter for more information.

Using apertures

aperture A mask that limits the amount of light reaching the sample and isolates the area of interest.

You can use either of two types of apertures for a mapping experiment: circular or rectangular. A circular aperture is fixed to define a circular sampling region. Rectangular apertures are variable; you can adjust the four sides to define any size sample area. You can also rotate a rectangular aperture to the desired angle.

Note The Continuμm microscope has an adjustable, rectangular aperture. A circular aperture is not available.

The same aperture size and orientation should be used for the background and the sample spectra in a map.

The aperture size should be large enough to provide enough signal through the microscope, but small enough to isolate the smallest area of interest in the mapping region. Sometimes a compromise between the two must be used.

Note If you have a Continuμm microscope with the optional automated Reflex aperture, you can use different aperture settings for the points in a discrete-point collection. The aperture is adjusted automatically at each point during the collection. See "Using different aperture settings for discrete points" in the "The Atlμs Window" chapter for details.

Note A second, complementary way to define the smallest area of interest is by setting the step size (the distance between sample points). For example, you can distinguish changes in the mapped area to within 1 micrometer by using 1-micrometer steps, even though the aperture size may be 20 by 10 micrometers.

See "Using the tool palette" in the "The Atlμs Window" chapter and "Aperture parameters" in the "Atlμs Window Menus" chapter for more information on specifying apertures.

Performing a mapping experiment

A mapping experiment typically consists of some or all of the following main steps. (See "Collecting ATR data with autofocus" in the "Atlμs Window Menus" chapter for procedures for collecting ATR data.)

1. Position the sample on the stage and focus.
2. Specify the map sequence.
3. Set the data collection and optical bench parameters.
4. Set the profile and display options. (This step is optional.)
5. Collect and display the map.
6. Print the map. (This step is optional.)

These steps are described later in this section. We refer you to the appropriate sections of this manual for complete information on using the needed software features.

Before you start

If you have not calibrated the video image for the microscope objective you will be using, calibrate it now or open a stored calibration. (If the Atlμs window is not displayed, first choose Show Atlμs Window from the Atlμs menu of the OMNIC window.) See "Calibrating the video image" in the "Atlμs Window Menus" chapter for complete information on creating and saving a calibration file. See "Opening a calibration file" in that chapter for details on opening a stored calibration.

The general steps that follow assume that a background can be collected using the sample. If this is not the case for your experiment, you can collect a background using an appropriate material before collecting the map or data from discrete points. See "Using the tool palette" in the "The Atlμs Window" chapter for details on using the palette tools to specify a background point and "Collecting a background" in the same chapter for information on collecting a background. *Use Clear in the Edit menu of the Atlμs window to clear the background point from the navigation pane and video pane before specifying the map sequence.*

Step 1: Position the sample on the stage and focus

Position the sample on the microscope stage so that it is perfectly level. If the sample cannot be made level over the entire mapping region, you will need to refocus the stage before each spectrum is collected during the experiment. You can use the Options tab in the Map Setup dialog box to set the software to pause so that you can adjust the focus. If you have the optional autofocus feature, you can use the Focus tab in the Map Setup dialog box to specify that the microscope be focused automatically before collecting each sample spectrum. See "Focus" in the "Atlμs Window Menus" chapter for details.

Step 2: Specify the map sequence

Use the Atlμs window palette tools or Map Setup in the window's Collect menu to specify the map sequence. The map sequence defines the mapping region for the sample and includes information about the following items: sample points, a background point, any aperture that is used and various option settings. See "Using the tool palette" in "The Atlμs Window" chapter and "Setting up data collection" in the "Atlμs Window Menus" chapter for complete information.

You can also open a stored sequence if you previously created a sequence and saved it on a disk. If you open a sequence, skip to the next step unless you want to make changes to the sequence before collecting the map. See "Opening a map sequence" in the "Atlμs Window Menus" chapter for more information.

Step 3: Set the data collection and optical bench parameters

Use Bench Setup in the Collect menu of the Atlμs window to set the optical bench parameters for data collection. (Do not use Experiment Setup in the Collect menu of the OMNIC window to set the parameters.)

If you are using an infrared microscope, set Sample Compartment to Right μScope %T, Right μScope %R, Left μScope %T or Left μScope %R, depending on whether the microscope is installed to the left or right of the optical bench and whether you are performing a transmission or reflection experiment. If you are using a Continuμm, Nic-Plan or IRμs microscope, the setting you select positions the mirrors in the microscope for data collection.

If you are using the FT-Raman Microprobe Accessory, set Sample Compartment to Microscope.

Use the Collect tab in the Map Setup dialog box to set Final Format to the format that is appropriate for the kind of data you will be collecting. Set the other Collect parameters as appropriate for your experiment. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details.

Step 4: Set the profile and display options (optional)

If you are collecting an area map, you can use Profile Options in the Collect menu to specify the type of profile to use for the map and the needed frequency or component information. See "Setting the profile options" in the "Atlμs Window Menus" chapter for details.

You can specify how to display the collected line map or area map by using Display Options in the Collect menu. The default setting is Chemigram. See "Setting the display options" in the "Atlμs Window Menus" chapter for more information.

Note This step is entirely optional. After you collect the map, you will be able to use the Profile Setup button in the map window and Display Options in the Atlμs menu of the OMNIC window to create profiles and change the display parameters. See "Creating a profile" in the "Map Windows" chapter and "Setting the display options" in the "Atlμs Menu Commands" chapter for details. ▲

Step 5: Collect and display the map

To collect the map, or data from discrete points, choose Collect Map from the Collect menu of the Atlμs window. As spectra are collected, the progress of the collection is shown in each of the Atlμs window panes, and related information appears in the description bar above the tool palette.

- If you are collecting a map, you are prompted to save the data after all the spectra have been collected. After you have saved the data, it appears in a map window and you can begin working with it.

- If you are collecting data at discrete points, the collected spectra appear in a spectral window. To save the spectra, use Save in the File menu of the OMNIC window.

Important After you collect a map, it is automatically saved using the filename DEFAULT.MAP. Every time you collect a new map, this filename is used and the old map is overwritten by the new map. Therefore, it is a good idea to save your map using a unique name after you have collected it. Use Save Map As in the Atlμs menu of the OMNIC window to do this. ▲

See "Collecting sample data" in the "Atlμs Window Menus" chapter for more information on collecting a map or data from discrete points. See the "Map Windows" chapter and the command descriptions in the "Atlμs Menu Commands" chapter for complete information on working with map data within a map window.

Step 6: Print the map (optional)

You can print the contents of the map window on a single sheet of paper by using Print in the File menu of the OMNIC window. The items that are printed depend on the information you are displaying. The following table shows what is printed in each situation. Since the spectral display pane is always displayed (except when you are displaying a waterfall), it is not mentioned in the first column of the table.

If this is displayed...	*This will be printed...*
line contour map	line contour map
line contour map with video image	spectral display pane, video image and line contour map
waterfall	waterfall
area contour map	area contour map
area contour map with video image	spectral display pane, video image and area contour map
area contour map with 3-D image	spectral display pane, area contour map and 3-D image
area contour map with video image and 3-D image	spectral display pane, video image, area contour map and 3-D image

Note If you have expanded a line contour map to display an area of interest, the map may be printed with a larger range of data in order to accommodate differences between the display monitor and the printer. ▲

You can also print a spectrum from a map by copying the spectrum from the spectral display pane of the map window, pasting the spectrum into a spectral window and then using the Print command.

If you saved the video image using Save Video Image in the Image menu of the Atlμs window, you can print the image by using a paint program to open the saved bitmap (BMP) file that contains the image and then print the image. See “Saving the video image” in the “Atlμs Window Menus” chapter for information on saving the video image.

To print the entire map window, first maximize it and choose Copy from the Edit menu of OMNIC to copy an image of the window to the Clipboard. You can then use an appropriate application to paste the image into a document and print it. Not all word processing or graphics applications will be able to print the image.

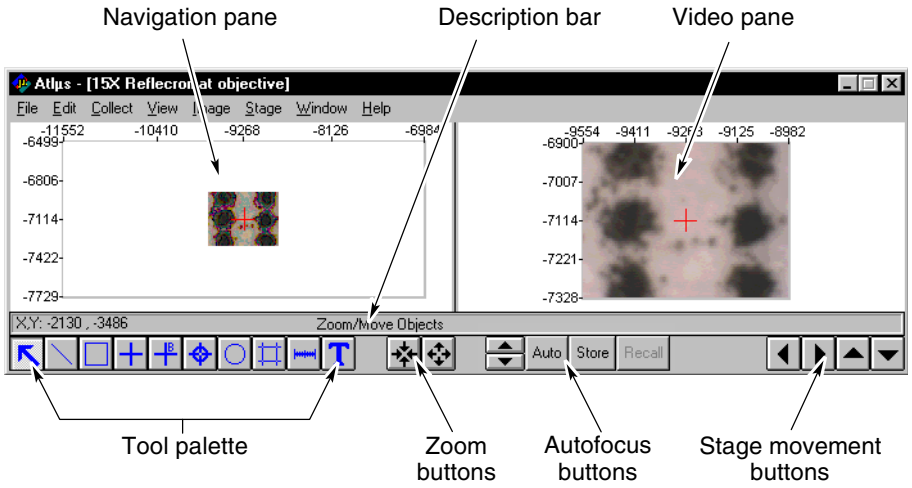
If you are displaying a Mosaic of video images in a Video Mosaic window, you can print it by using the Print button. See “Displaying a stored Mosaic” in the “Atlμs Menu Commands” chapter for details.

You can use the report features of OMNIC to add map data and video images to a report and print the report. See the OMNIC Help system for details.

See your Windows documentation and the OMNIC Help system if you need information on setting the parameters that affect printing.

3 The Atlµs Window

The Atlµs window provides the features you need to set up and perform a mapping experiment. The window appears at the top of the screen when you choose Show Atlµs Window from the Atlµs menu. (The OMNIC window is resized to fit below the Atlµs window.)



The Atlµs window

The Atlµs window contains two panes: the navigation pane and the video pane. These panes let you graphically specify a map sequence and view the sample.

The menu bar of the Atlµs window gives you access to all the commands needed for specifying a map sequence, collecting a map or data from discrete points, adjusting the display and performing other operations. Each command is fully described in the "Atlµs Window Menus" chapter.

At the bottom of the Atlμs window are several tools and buttons you can use to draw maps and apertures and adjust the display of information in the panes. These are described later in this chapter.

Note If you have a Continuμm microscope with the optional automated Reflex aperture system, the aperture tools do not appear in the window; you use other features to specify the size and orientation of the aperture. See "Adjusting the automated Reflex aperture on a Continuμm microscope" for details. If your Continuμm does not have this option, the rectangular aperture tool is provided. ▲

The description bar displays information about the operation you are performing or tool you are currently using.

The navigation pane

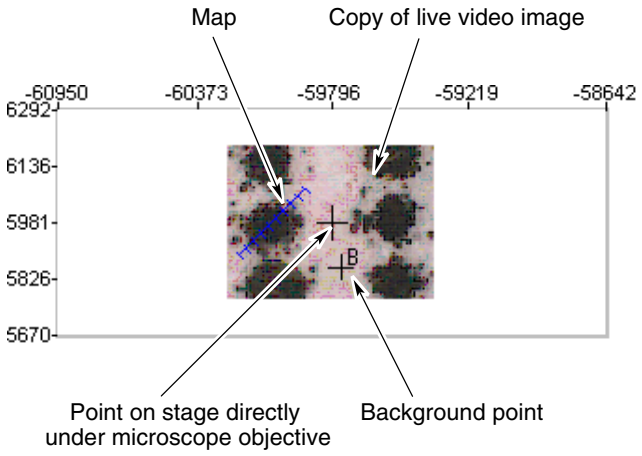
When displayed “full view,” the navigation pane of the Atlμs window shows graphically the possible range of movement of the microscope stage. The X-axis and Y-axis of the pane correspond to the side-to-side and front-to-back movements of the stage, respectively. (See “Displaying the full range of stage travel” in the “Atlμs Window Menus” chapter for information on using the Full View command.)

You can change the displayed stage area by using the arrow tool (see “Zooming in on an area in the navigation pane”), the zoom buttons (see “Using the zoom buttons”) or commands in the View menu.

If you display the entire range of movement in the navigation pane, the video image is too small to be seen.

The navigation pane includes a video image of the sample area being viewed. This image is a copy of the live video image displayed in the video pane, although it may be larger or smaller depending on how you have adjusted the display. The copy is updated whenever the stage moves or the navigation pane is resized or moved.

Here is an example showing the navigation pane with a map drawn and a background point specified:



Navigation pane

When the Atlμs window is first displayed, the sample area included in the navigation pane is several times larger than one video frame. Because of this, the copy of the video image is displayed smaller than the image in the video pane. Here is an example:

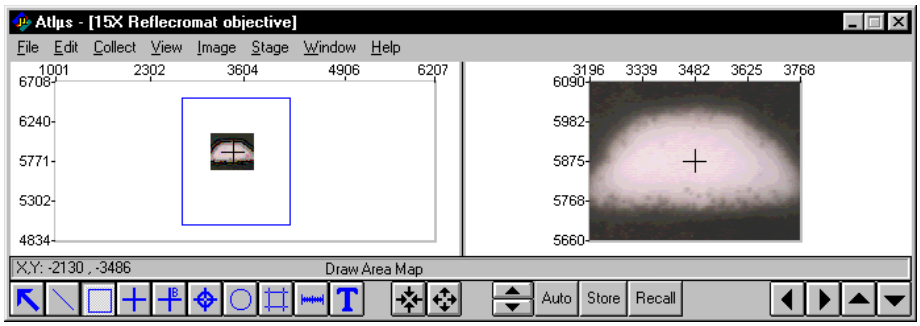
You can use tools within the navigation pane to specify the size and location of a map and the location of a background point. See “Using the tool palette” for complete information on using the tools.

The X and Y proportions (aspect ratio) of the navigation pane always match those of the video pane (if present), except when you use Full View in the View menu of the Atlμs window to show the entire range of stage movement. Because of this, any map you draw in a zoomed-in area of the navigation pane will have the same shape in the video pane. Together, the matching proportions and the copy of the video image make it easy to see the correspondence between the two panes as you change the view of the sample.

Capturing and displaying a Mosaic

You can capture a Mosaic of video images of a sample area and display it in the navigation pane. This is useful when you are defining a map that is larger than one video frame or want a video record of a large sample area.

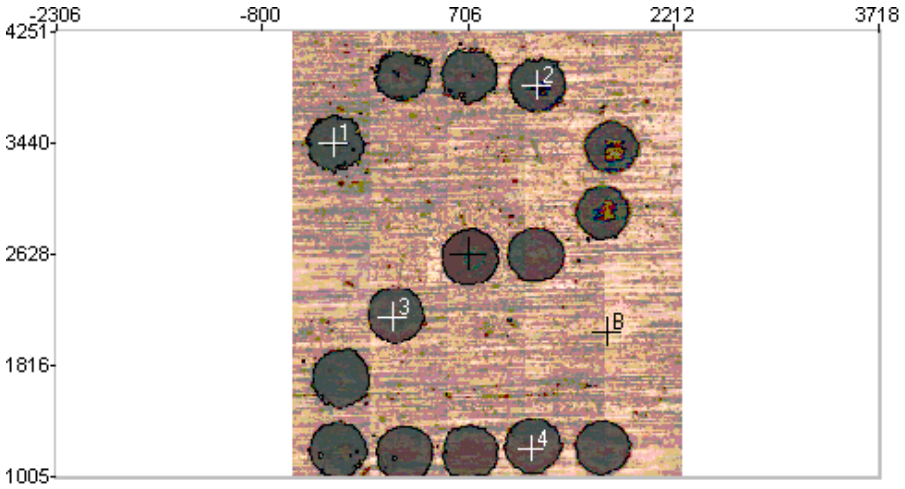
You first specify the sample area by using the area map tool to draw a box in the navigation pane (this is identical to drawing an area map.) Here is an example:



You then choose Capture Mosaic from the Image menu. Here is an example of a captured Mosaic:

Notice that the Mosaic covers a larger area of the sample than that displayed in the video pane.

Once a Mosaic is displayed, you can draw a map on it or specify sample points and a background point on it. Here is a Mosaic comprising many video images, with some discrete sample points and a background point specified:



Note If the cross hairs that indicate the current stage location fall within the area of a Mosaic, the copy of the live video image is replaced by the captured image of that sample area. If you move the stage so that the cross hairs are outside the Mosaic, the copy of the live video image once again appears in the navigation pane. ▲

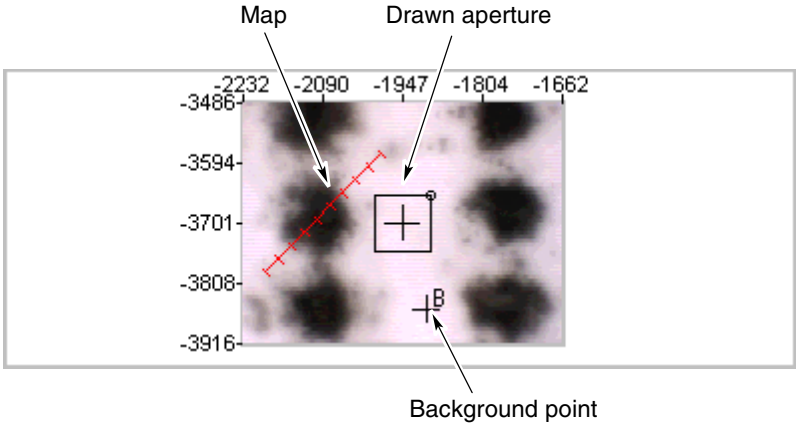
You can clear, copy, save or print the Mosaic by using commands in the Image menu. See “Image menu commands” in the “Atlµs Window Menus” chapter for complete information on capturing and working with Mosaics.

The video pane

The video pane appears at the right side of the Atlµs window along with related tools in the tool palette. A live video image appears in the video pane. The stage coordinates that are visible within the pane are indicated by the X-axis and Y-axis.

Here is an example showing some items that you can draw in the video pane:

A copy of the video image appears in the navigation pane, although it may be too small to be seen if a large area is being displayed in that pane.



Video pane

You can display different areas of the sample in the video pane by using the stage movement tool (see “Moving the stage by clicking a point”)or the stage movement buttons (see “Changing the view with the stage movement buttons”).

You can use tools within the video pane to specify map sizes and locations, background points and apertures. See “Using the tool palette” for complete information on using the tools.

Note If you have a Continuµm microscope with the optional automated Reflex aperture system, the aperture tools are not needed and therefore do not appear in the window. If you have a Continuµm microscope without that option, the rectangular aperture tool is provided but the circular aperture tool is not needed and therefore does not appear. See "Adjusting the automated Reflex aperture on a Continuµm microscope" for information on adjusting the aperture. ▲

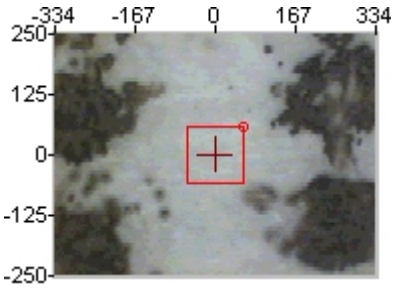
Because the X and Y proportions (aspect ratio) of the navigation pane always match those of the video pane (except when you use Full View in the View menu of the Atlµs window to show the entire range of stage movement), any map you draw in the video pane will have the same shape in a zoomed-in area of the navigation pane.

Important Set the stage controller so that the direction of movement along the X-axis and Y-axis matches the movement indicated in the video pane. See your controller manual for instructions. ▲

You can change the size of the video image by using 160 x 120, 240 x 180, 320 x 240 and 640 x 480 in the Image menu. See the "Atlµs Window Menus" chapter for more information.

Adjusting the automated Reflex aperture on a Continuµm microscope

If you have a Continuµm microscope with the optional automated Reflex aperture system (must be installed by Thermo Nicolet), the Reflex aperture is represented in the video pane by a box whose size, shape and orientation you can manipulate. Here is an example:



The aperture is adjusted automatically to match the box.

Since the box is always present, the rectangular aperture tool and circular aperture tool are not available. Also, the Aperture tab of the Map Setup dialog box contains only three parameters, for setting the X dimension, Y dimension and angle of rotation (θ) of the aperture.

Note The minimum size of the automated Reflex aperture is nominally 5 by 5 micrometers. If you attempt to set the aperture to this or a smaller size, the system will automatically adjust the aperture to the minimum size possible on your microscope (typically, 8 by 8 micrometers). The minimum available size varies slightly from system to system. ▲

Use the arrow tool to change the size, shape and orientation of the Reflex aperture:

To change the size or shape of the automated aperture, use the arrow tool to point to a side or unmarked corner of the box and drag it. (One corner has a small circle, described below.) Release the mouse button when the box is the desired size and shape.

To rotate the automated aperture, use the arrow tool to drag the small circle located at one corner of the box. Release the mouse button when the box is at the desired angle.

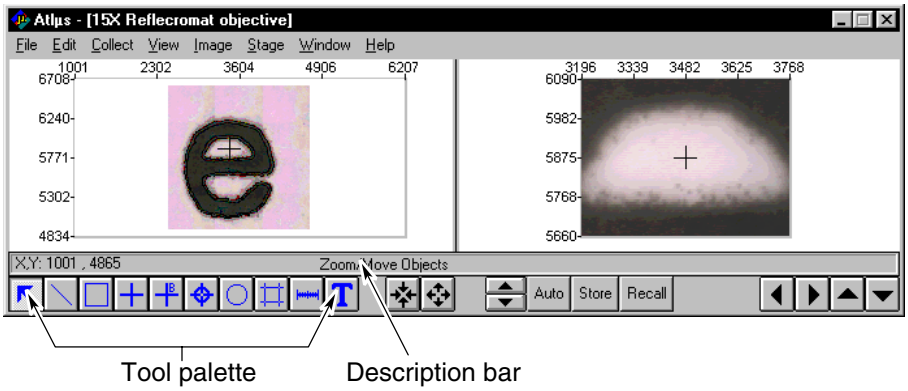
Note You can also specify the size and shape of the aperture by typing values on the Aperture tab of the Map Setup dialog box. See "Aperture parameters" in the "Atlμs Window Menus" chapter for details. ▲

Important Use only the software to adjust the aperture; do *not* use the Reflex aperture control knobs on the microscope. If you do adjust the knobs, you will need to turn the microscope power off and on. Follow these precautions: If the microscope has a motorized stage or the autofocus option, remove the nosepiece and lower the condenser all the way before turning on the power. After the microscope has initialized, reinstall the nosepiece. ▲

For more information about the Reflex aperture, see the documentation that came with your microscope.

Using the tool palette

The tool palette provides you with tools for graphically specifying and manipulating map sequence information in the Atlµs window. The palette is located in the lower-left corner of the window:



When you select a tool, a brief description of its function appears in the description bar. When you move a tool into the navigation pane or video pane, the coordinate values of the pointer location appear. (When displayed, the Z value is the current Z position of the stage.)

The table below shows which tool to use to perform various operations:

To do this...	*Use this tool...*
Zoom in on a sample area by specifying the area to expand.	 arrow tool
Move an object on the screen.	 arrow tool
Resize an object on the screen.	 arrow tool
Move or edit text annotation in the video pane.	 arrow tool

(continued on next page)

To do this...	*Use this tool...*
Quickly move to a discrete point to view it again (by clicking the point using the right mouse button).	 arrow tool
Rotate a drawn rectangular aperture.	 arrow tool
Draw a line map and specify a background point.	 line map tool
Draw a line map by specifying endpoints.	 line map tool
Draw an area map (or specify a sample area for capturing a Mosaic) and specify a background point.	 area map tool
Draw an area map by specifying corner points.	 area map tool
Specify discrete sample points or an ordered array of discrete points, and a background point.	 sample point tool
Specify a background point.	 background point tool
Move the stage.	 stage movement tool
Draw a circular aperture.	 circular aperture tool

(continued on next page)

To do this...	*Use this tool...*	
Draw a rectangular aperture.		rectangular aperture tool
Display a ruler in the video pane.		ruler tool
Add text annotation to the video image.		text tool

The next sections explain how to use the tools to perform these operations.

Zooming in on an area in the navigation pane

Use the following procedure to use the arrow tool to zoom in on area in the navigation pane.

1. **Select the arrow tool.**

2. **Use the tool to draw a box around the area in the navigation pane that you want to expand to fill the pane.**

   To draw the box, point to where you want a corner of the box to be located. Press and hold down the mouse button. Move the pointer to where you want the opposite corner of the box located. As you move the mouse, the new X and Y stage coordinates of the first and opposite corners appear in the description bar as the “X1,Y1” and “X2,Y2” values, respectively. Release the mouse button when the box is the size and shape you want.

3. **Click inside the box.**

   The boxed area expands to fill the pane. The axes are updated to reflect the stage dimensions of the newly displayed area.

Note To zoom out in order to see more of the stage area, use the zoom out button. See "Using the zoom buttons" for details. ▲

Moving a map

You can use the arrow tool to move a line map or area map within the navigation pane or video pane without changing the appearance of the map. You can also move a box drawn in the navigation pane to specify a sample area for capturing a Mosaic.

Moving a line map

To move a line map, follow these steps:

1. **Select the arrow tool.**

2. **Move the pointer over the midpoint of the map so that the directional arrows shown below appear.**

3. **Drag the map to the desired location.**

   The length and slope of the map remain the same. As you move the map, its length in micrometers appears in the description bar.

4. **Release the mouse button.**

   The next time you use Map Setup, the information for the moved map will appear in the Map Setup dialog box. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details.

Moving an area map or box drawn to specify a Mosaic

To move an area map or box drawn to specify a Mosaic, follow these steps:

1. **Select the arrow tool.**

2. **Move the pointer over the center of the map (or box) so that the directional arrows shown below appear.**

3. **Drag the map (or box) to the desired location.**

   The size and shape of the map (or box) remain the same.

   As you move the map (or box), its X and Y dimensions appear in the description bar.

4. **Release the mouse button.**

   The map (or box) appears in the new location. The next time you use Map Setup, the information for the moved map will appear in the Map Setup dialog box. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

Moving a discrete sample point or background point

Follow the steps below to use the arrow tool to move a discrete sample point or background point within the navigation pane or video pane:

2. **Move the pointer over the point you want to move so that directional arrows appear to the right of the pointer.**

3. **Drag the point to the desired location.**

   As you move the point, its new X and Y stage coordinates appear in the description bar.

4. **Release the mouse button.**

   If the point is a background point, its new location will appear on the Dimensions tab the next time you use Map Setup. See "Setting up data collection" in the "Atlµs Window Menus" chapter for details.

Resizing a line map

Use the procedure below to use the arrow tool to change the length or slope of a line map within the navigation pane or video pane:

1. **Select the arrow tool.**

2. **Move the pointer over the map endpoint you want to move so that directional arrows appear to the right of the pointer.**

3. **Drag the endpoint to change the length and slope of the line as desired.**

   As you move the endpoint, the new length of the map in micrometers appears in the description bar.

Note The starting and ending points of a line map are determined by the X values of both endpoints. The endpoint with the lower X value is designated the starting point; the endpoint with the greater X value is the ending point. Therefore, depending on where you drag an endpoint, the starting and ending points for the map might be interchanged in the Map Setup dialog box. See "Setting up data collection" in the "Atlµs Window Menus" chapter for more information. ▲

4. **Release the mouse button.**

   The next time you use Map Setup, the information for the changed map will appear on the Dimensions tab. See "Setting up data collection" in the "Atlµs Window Menus" chapter for details.

Note When you release the mouse button, the changed map may vary from the line you specified by dragging the endpoint. This is because the length of the map must be adjusted for the step size specified in the Map Setup dialog box (or to the aperture size default). See "Setting up data collection" and "Specifying a default step size" in the "Atlµs Window Menus" chapter for more information.

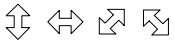
For example, if you used the mouse to specify a line map with a length of 100 micrometers and the step size is set to 22 micrometers, the length is automatically adjusted to 110 micrometers so that the step size is divided evenly into the map length. Map lengths always expand to compensate for step intervals; they are never less than the length you specified with the mouse. ▲

Resizing an area map or box drawn to specify a Mosaic

Follow the steps below to use the arrow tool to resize an area map within the navigation pane or video pane. You can also resize a box drawn in the navigation pane to specify a sample area for capturing a Mosaic.

1. **Select the arrow tool.**

2. **Move the pointer over the side or corner of the map (or box) you want to move so that one of the directional arrow pointers shown below appears.**



3. **Drag the side or corner until the map (or box) is the desired size and shape.**

   As you move the mouse, the new X and Y dimensions of the map (or box) in micrometers appear in the description bar.

4. **Release the mouse button.**

   The next time you use Map Setup, the information for the resized area map will appear on the Dimensions tab. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details.

Note When you release the mouse button, the resized map may vary from the area you specified by dragging. This is because the size of the map must be adjusted for the step size specified in the Map Setup dialog box (or to the aperture size default). See "Setting up data collection" and "Specifying a default step size" in the "Atlμs Window Menus" chapter for more information.

For example, if you used the mouse to specify a new map area of 100 by 100 micrometers and the step size is set to 23 micrometers in both the X and Y dimensions, the map area is automatically adjusted to 115 by 115 micrometers so that the step size is divided evenly into the map area. Map areas always expand to compensate for step intervals; they are never less than the area you specified with the mouse. ▲

Resizing a drawn circular aperture

Use the following procedure to use the arrow tool to resize a circular aperture you have drawn in the video pane. The drawn aperture remains symmetrical about the center point.

1. **Select the arrow tool.**

2. **Move the pointer over the perimeter of the drawn aperture so that directional arrows appear to the right of the pointer.**

3. **Drag the perimeter until the drawn aperture is the desired size.**

   As you move the mouse, the new diameter in micrometers appears in the description bar.

4. **Release the mouse button.**

   The next time you use Map Setup, the new diameter will appear on the Aperture tab. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

Note Adjust the aperture installed in the microscope to match the size of the drawn aperture before collecting data. ▲

Resizing a drawn rectangular aperture

Follow the steps below to use the arrow tool to resize a rectangular aperture you have drawn within the video pane. The drawn aperture remains symmetrical about the center point.

1. **Select the arrow tool.**

2. **Move the pointer over a side or corner of the drawn aperture (except the corner marked with a small circle) so that one of the pairs of directional arrows shown below appears.**

The corner marked with a small circle is used for rotating the aperture. See “Rotating a drawn rectangular aperture” for more information.

3. **Drag the side or corner until the drawn aperture is the desired size and shape.**

As you move the mouse, the new X and Y dimensions appear in the description bar.

4. **Release the mouse button.**

The next time you use Map Setup, the new dimensions will appear on the Aperture tab. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

Note Adjust the aperture installed in the microscope to match the size, shape and orientation of the drawn aperture before collecting data. (The system does this automatically if you have a Continuμm microscope with the optional automated Reflex aperture system.) ▲

Moving the ruler

Follow the steps below to use the arrow tool to move the ruler displayed with the ruler tool within the video pane. See “Displaying a ruler” for details on displaying a ruler.

1. **Select the arrow tool.**

2. **Move the pointer over the center of the ruler, between the endpoints, so that the directional arrows shown below appear.**

3. **Drag the ruler to the desired location.**

   As you move the ruler, its length in micrometers appears in the description bar.

4. **Release the mouse button.**

Resizing the ruler

Follow the steps below to use the arrow tool to resize the ruler displayed with the ruler tool within the video pane. See “Displaying a ruler” for details on displaying a ruler.

1. **Select the arrow tool.**

2. **Move the pointer over the ruler endpoint you want to move so that directional arrows appear to the right of the pointer.**

3. **Drag the endpoint to change the length and slope of the ruler as desired.**

   As you move the endpoint, the new length of the ruler in micrometers appears in the description bar.

4. **Release the mouse button.**

Moving text annotation

Follow the steps below to use the arrow tool to move text annotation created with the text tool within the video pane.

1. **Select the arrow tool.**

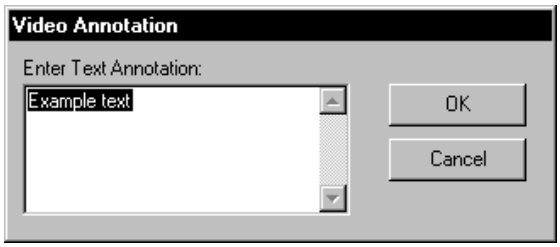
2. **Move the pointer over the text you want to move so that the directional arrows shown below appear.**

3. **Drag the text to the desired location.**

   As you move the text, any lines that were drawn with the text are adjusted for the new text location.

4. **Release the mouse button.**

   A dialog box appears allowing you to edit the text if desired:



5. **To keep the current text, just choose OK. To edit the text, type the desired changes and then choose OK.**

   While editing, you can press Enter on the keyboard to begin a new line of text. If you want to delete the text annotation completely, delete the text in the text box and then choose OK.

Editing text annotation

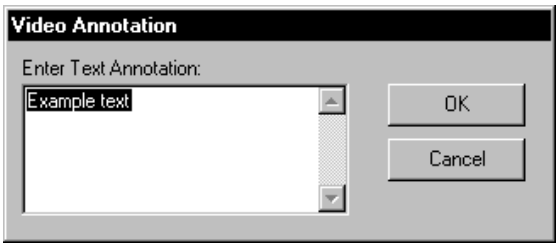
Follow the steps below to use the arrow tool to edit text annotation created with the text tool within the video pane.

1. **Select the arrow tool.**

2. **Move the pointer over the text you want to edit so that the directional arrows shown below appear.**

3. **Click once.**

   A dialog box appears:



4. **Type the desired changes.**

   While editing, you can press Enter on the keyboard to begin a new line of text. If you want to delete the text annotation completely, delete all the text in the text box.

5. **Choose OK.**

Revisiting a discrete point

Follow the steps below to use the arrow tool to "revisit" a discrete point to view it again.

1. **Select the arrow tool.**

2. **In the navigation pane or video pane, move the pointer over the discrete point you want to revisit so that four directional arrows appear to the right of the pointer.**

3. **Press and release the *right* mouse button.**

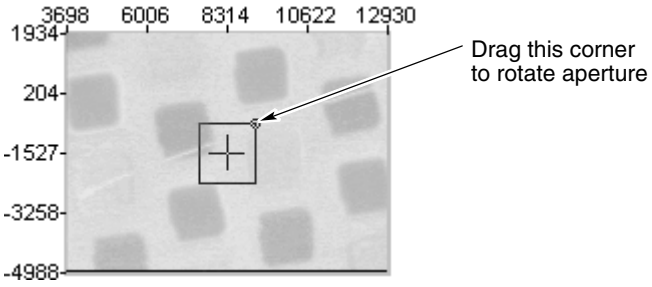
   The stage moves to the point.

Rotating a drawn rectangular aperture

After you draw a rectangular aperture in the video pane with the rectangular aperture tool, you can use the arrow tool to rotate the drawn aperture.

Follow these steps:

1. **Select the arrow tool.**



A corner of the drawn aperture is marked with a small circle. You will perform the rotation by dragging this corner.

2. **Move the pointer over the corner that is marked with a small circle.**

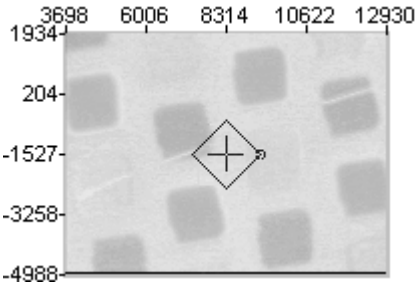
   The pointer looks like this when it is over the marked corner:

3. **Drag the marked corner clockwise or counterclockwise until the drawn aperture is displayed at the desired angle.**

   You can drag in either direction up to a maximum of 45 degrees of rotation. With this range of rotation plus the ability you have to resize a drawn aperture with the arrow tool, any combination of orientation and rectangular shape is possible.

   Here is an example showing a rectangular aperture rotated approximately 45 degrees:

The angle of rotation appears in the description bar as you move the mouse. A counterclockwise rotation is shown as a positive angle; a clockwise rotation is shown as a negative angle.



4. **When the drawn aperture has the desired rotation, release the mouse button.**

   The next time you use Map Setup, the dimensions and the angle of rotation will appear on the Aperture tab. See “Setting up data collection” in the “Atlµs Window Menus” chapter for details.

You can also resize the drawn aperture with the arrow tool. See "Resizing a drawn rectangular aperture" for details.

Note Adjust the aperture installed in the microscope to match the size, shape and orientation of the drawn aperture before collecting data. (The system does this automatically if you have a Continuμm microscope with the optional automated Reflex aperture system.) ▲

Drawing a line map and specifying a background point

Use the line map tool to draw a new line map in the navigation pane or video pane, replacing any map that is currently displayed in these panes. After you draw the map, you can use the right mouse button to specify a background point for the map. Follow these steps:

1. **Select the line map tool.**

2. **Point to the location in the navigation pane or video pane where you want the line to start.**

   The pointer looks like this when you move it into the pane:

As you move the mouse, the X and Y stage coordinates of the pointer location appear in the description bar.

Note The starting and ending points of a line map are determined by the X values of both endpoints. The endpoint with the lower X value is designated the starting point; the endpoint with the greater X value is the ending point. Therefore, depending on how you draw the line, the point where you start drawing may be the starting or ending point when you are finished. ▲

3. **Press and hold down the mouse button.**

4. **Move the pointer to the location where you want the line to end.**

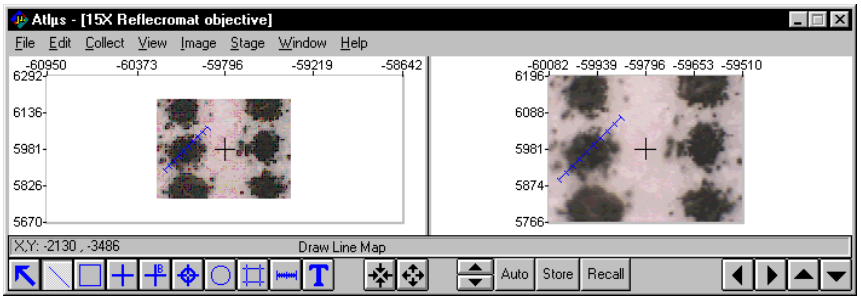
   The line changes in length and direction as you move the mouse. The length of the line in micrometers appears in the description bar.

5. **Release the mouse button.**

   If there was a map displayed in the pane, it is replaced by the new line map.

   When you draw a map in the navigation pane or video pane, the map appears in both panes (if present), although you may need to use the arrow tool or zoom buttons to zoom in to see the map in the navigation pane. See “Zooming in on an area in the navigation pane” or “Using the zoom buttons” for more information.

   The following illustration shows a drawn line map in the navigation and video panes:



The tick marks on the line indicate the locations of sample points. If the view of the data is zoomed out too far in the navigation pane, the steps (distances between points) may be displayed too small to allow you to see the point locations in that pane.

Note When you release the mouse button, the length of the map may vary from the line you drew by dragging. This is because the length of the map must be adjusted for the step size specified in the Map Setup dialog box (or to the aperture size default). See "Setting up data collection" in the "Atlμs Window Menus" chapter for more information.

For example, if you used the mouse to specify a line map with a length of 100 micrometers and the step size is set to 22 micrometers, the length is automatically adjusted to 110 micrometers so that the step size is divided evenly into the map length. Map lengths always expand to compensate for step intervals; they are never less than the length you specified with the mouse. ▲

The next time you use Map Setup, the information for the map will appear on the Dimensions tab. The default step size is determined by which Default Step Size option is selected in the Options dialog box. See "Specifying a default step size" in the "Atlμs Window Menus" chapter for more information. You can change the step size and number of points in the Map Setup dialog box.

Note You can also specify a line map by entering X and Y values in the Map Setup dialog box. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details. ▲

6. **If desired, use the right mouse button to click a location in the navigation pane or video pane for the background point for the map.**

   The background point appears at the clicked location, replacing any existing background point, and is labeled with the letter "B."

   The next time you use Map Setup, the location of the background point will appear on the Dimensions tab.

If you want to change the location of the background point, use the right mouse button to click a new location in the navigation pane or video pane.

As you move the mouse to the desired point, the X and Y stage coordinates of the pointer location appear in the description bar. The background point appears at the location you clicked.

Note If there is not an appropriate place on your sample to collect a background, you can define a background point and collect the background spectrum before defining and collecting a new map. See "Collecting a background" in the "Atlµs Window Menus" chapter for more information. ▲

Note You can also use the arrow tool to drag the background point to a new location. See "Moving an object" for details. ▲

To clear the map and start over, choose Clear from the Edit menu of the Atlµs window. See "Clearing a map sequence" in the "Atlµs Window Menus" chapter for complete information.

A tip for drawing large maps You may find it helpful to use a two-step procedure when you need to draw a map longer than one video frame. See "Drawing a line map by specifying endpoints." ▲

Drawing a line map by specifying endpoints

You can use the line map tool to quickly draw a new line map in the navigation pane or video pane by specifying the endpoints of the line. The new map replaces any map that is currently displayed in these panes. Drawing a line map by specifying endpoints is especially useful when the map needs to be longer than one video frame.

Note You may find it easier to draw a long line map in the navigation pane if you first display video images of the sample area of interest. See "Capturing a Mosaic of video images for a sample area" in the "Atlµs Window Menus" chapter for details. ▲

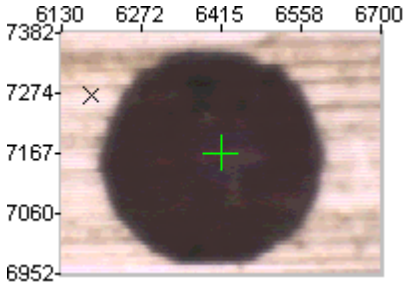
After you draw the map, you can use the right mouse button to specify a background point for the map.

Follow these steps:

1. **Select the line map tool.**

2. **In the navigation pane or video pane, click the desired location for the starting point of the map.**

An “X” appears at the point.



3. **In the same pane, click the desired location for the ending point of the map.**

   If the desired point is not within the currently displayed area (for example, if you are drawing a very long map), use the stage movement buttons bring the point into the pane.

   The map is drawn between the clicked points.

Drawing an area map (or Mosaic) and specifying a background point

You can use the area map tool to draw an area map in the navigation pane or video pane, replacing any map that is currently displayed in these panes. After you draw the map, you can use the right mouse button to specify a background point for the map.

You can use the same procedure (except no background point is needed) to specify a sample area in the navigation pane for capturing a Mosaic of video images of that area. See “Capturing a Mosaic of video images for a sample area” in the “Atlµs Window Menus” chapter for more information on capturing a Mosaic.

Follow these steps:

1. **Select the area map tool.**

2. **Point to the position in the navigation pane or video pane where you want a corner of the map (or Mosaic) to be located.**

   The pointer looks like this when you move it into the pane:

As you move the mouse, the X and Y stage coordinates of the pointer location appear in the description bar.

3. **Press and hold down the mouse button.**

4. **Move the pointer to where you want the opposite corner of the map (or Mosaic) located.**

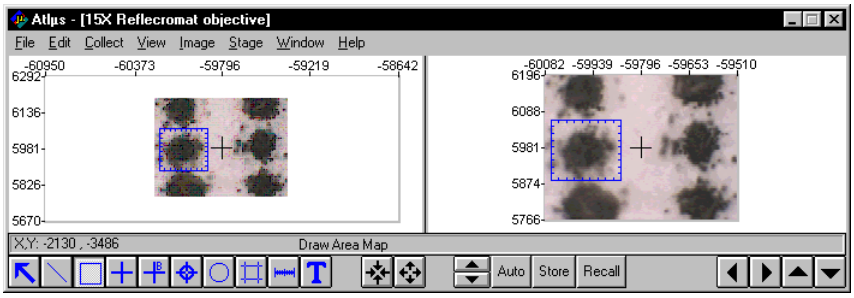
   The map (or box for specifying the Mosaic) changes size and shape as you move the mouse. The X and Y dimensions of the map (or box) in micrometers appear in the description bar.

5. **Release the mouse button.**

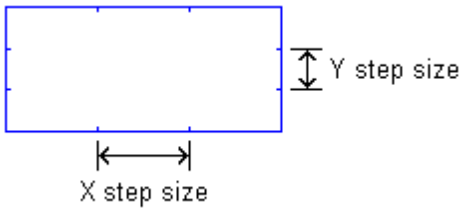
   If there was a map displayed in the pane, it is replaced by the new area map (or box).

   When you draw a map in the navigation pane or video pane, the map appears in both panes (if present), although you may need to use the arrow tool or zoom buttons to zoom in to see the map in the navigation pane. See “Zooming in on an area in the navigation pane” or “Using the zoom buttons” for more information.

The following illustration shows a drawn area map in the navigation and video panes:

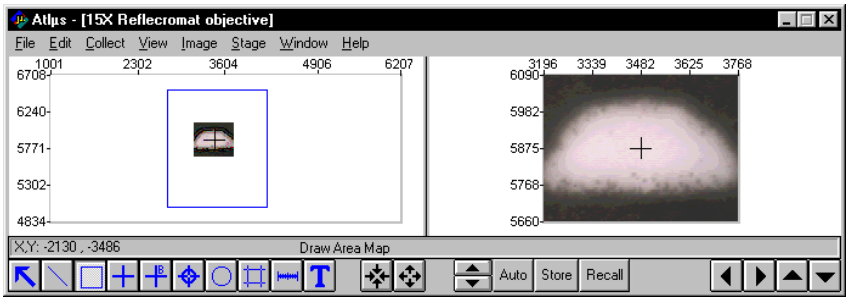


The tick marks along the sides of the map indicate the step sizes in the X and Y dimensions.



If the view of the data is zoomed out too far in the navigation pane, the tick marks may not be visible in that pane.

Here is an example of a box drawn in the navigation pane for specifying a sample area for capturing a Mosaic:



Note When you release the mouse button, the map may vary from the area you specified using the mouse. This is because the size of the map must be adjusted for the step size specified in the Map Setup dialog box (or to the aperture size default). See "Setting up data collection" and "Specifying a default step size" in the "Atlµs Window Menus" chapter for more information.

For example, if you used the mouse to specify a map area of 100 by 100 micrometers and the step size is set to 23 micrometers in both the X and Y dimensions, the map area is automatically adjusted to 115 by 115 micrometers so that the step size is divided evenly into the map area. Map areas always expand to compensate for step intervals; they are never less than the area you specified with the mouse. ▲

The next time you use Map Setup, the information for the map will appear on the Dimensions tab. The default step size is determined by which Default Step Size option is selected in the Options dialog box. See "Specifying a default step size" in the "Atlµs Window Menus" chapter for more information. You can change the step size and number of points in the Map Setup dialog box.

Note You can also specify an area map by entering X and Y values in the Map Setup dialog box. See “Setting up data collection” in the “Atlµs Window Menus” chapter for details. ▲

6. **If desired, use the right mouse button to click a location in the navigation pane or video pane for the background point for the map.**

   The background point appears at the clicked location, replacing any existing background point, and is labeled with the letter “B.”

   The next time you use Map Setup, the location of the background point will appear on the Dimensions tab.

   If you want to change the location of the background point, use the right mouse button to click a new location in the navigation pane or video pane. As you move the mouse to the desired point, the X and Y stage coordinates of the pointer location appear in the description bar. The background point appears at the location you clicked.

Note If there is not an appropriate place on your sample to collect a background, you can define a background point and collect the background spectrum before collecting the map. See “Collecting a background” in the “Atlµs Window Menus” chapter for more information. ▲

Note You can also use the arrow tool to drag the background point to a new location. See “Moving an object” for details. ▲

   To clear the map (or box) and start over, choose Clear from the Edit menu of the Atlµs window. See “Clearing a map sequence” in the “Atlµs Window Menus” chapter for complete information.

A tip for drawing large maps

You may find it helpful to use a two-step procedure when you need to draw a map larger than one video frame. See "Drawing an area map by specifying corner points." ▲

Drawing an area map by specifying corner points

You can use the area map tool to quickly draw an area map in the navigation pane or video pane by specifying corners of the map. The new map replaces any map that is currently displayed in these panes. Drawing an area map by specifying corner points is especially useful when the map needs to be larger than one video frame.

Note

You may find it easier to draw a large area map in the navigation pane if you first display video images of the sample area of interest. See "Capturing a Mosaic of video images for a sample area" in the "Atlµs Window Menus" chapter for details. ▲

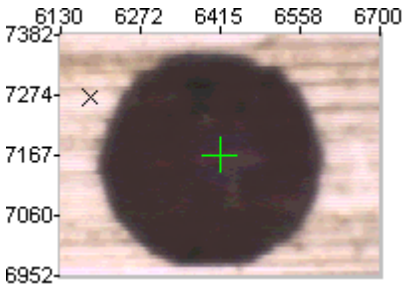
After you draw the map, you can use the right mouse button to specify a background point for the map.

Follow these steps:

1. **Select the area map tool.**

2. **In the navigation pane or video pane, click the desired location for the starting corner point of the map.**

An "X" appears at the point.



3. **In the same pane, click the desired location for the opposite corner point of the map.**

   If the desired point is not within the currently displayed area (for example, if you are drawing a very large map), use the stage movement buttons to bring the point into the pane.

   The map is drawn between the clicked points.

Specifying sample points and a background point

The sample point tool lets you graphically specify individual locations, or "discrete points," on the sample for collecting sample spectra. If your samples are regularly spaced on a microscope slide or other suitable surface, you can specify an "ordered array" of discrete points that matches the sample locations.

sample point A point on a sample at which a sample spectrum is collected during an experiment.

You can also use the tool to specify a background point location for any type of map or discrete point data collection. You can specify the points in either the navigation pane or video pane. The points replace any map that is currently displayed in these panes.

Specifying discrete points

You can use the sample point tool to specify individually the discrete points where you want to collect spectra. Follow these steps:

discrete point An individually specified location on a sample at which a sample spectrum is collected during a point-of-interest analysis.

1. **Select the sample point tool.**

2. **Use the left mouse button to click the location in the navigation pane or video pane where you want to specify a sample point.**

   The pointer changes to look like this when you move it into the pane:

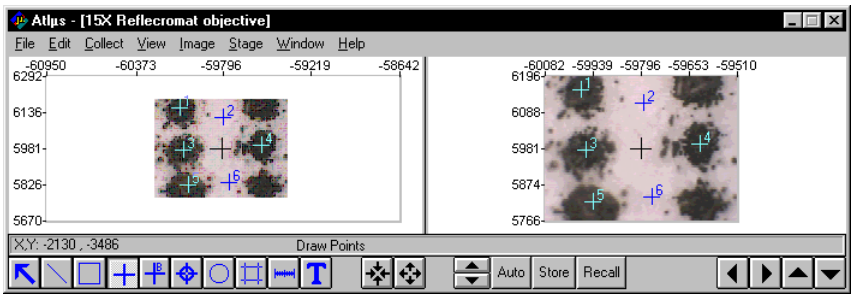
As you move the mouse, the X and Y stage coordinates of the tool location appear in the description bar.

Note If you have the optional autofocus feature, you can focus the microscope before specifying each point. Each focus position (Z value) is stored and will be used by the Use Stored Focus Locations (Discrete Points Only) option on the Focus tab of the Map Setup dialog box. ▲

If a line map or area map is currently displayed, it is removed when you specify the first point.

Each time you specify a sample point, a consecutively numbered cross hairs marker appears to indicate the point location. You can specify up to 1000 sample points.

The following illustration shows several sample points in the navigation and video panes:



Note If you have a Continuμm microscope with the optional automated Reflex aperture, you can use a different aperture setting for each of your discrete points. To do this, center the area of interest in the video pane, adjust the aperture and then use the sample point tool to click the center of the cross hairs. ▲

When you specify points in the navigation pane or video pane, the points appear in both panes (if present), although you may need to use the arrow tool or zoom buttons to zoom in to see the points in the navigation pane. See “Zooming in on an area in the navigation pane” or “Using the zoom buttons” for more information.

Note You can use the right mouse button to click a location in the navigation pane or video pane for the background point for the data collection. A cross hairs marker with the letter "B" appears, replacing any previously specified background point. The next time you use Map Setup, the information for the specified background point will appear on the Dimensions tab. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details. ▲

You can move any point by using the arrow tool. See "Moving a discrete sample point or background point" earlier in this chapter for details.

To clear all the points and start over, choose Clear from the Edit menu of the Atlμs window. See "Clearing a map sequence" in the "Atlμs Window Menus" chapter for complete information.

Using different aperture settings for discrete points

If you have a Continuμm microscope with the optional automated Reflex aperture, you can specify a different aperture size, shape and orientation for each point in a discrete-point collection. This is useful when the sample surface around the points of interest varies, and using a different aperture to isolate the desired area would improve the collected data. If you specify different aperture settings for the sample points, a new background is collected using the appropriate aperture setting for each point.

Follow these steps:

1. **Center the first sample area of interest in the video pane.**

2. **Adjust the Reflex aperture as desired for the first sample point.**

3. **Use the sample point tool to click the center of the cross hairs in the video pane.**

   This specifies the first sample point and stores the aperture settings in memory.

4. **Repeat the above steps for the next sample points.**

   Each time you specify a sample point, the aperture settings for that point are stored in memory.

5. **Use the right mouse button to specify the background location for the collection.**

   Whenever the aperture is adjusted for a sample point during collection, the system will automatically collect a new background at the background location using the new aperture setting.

6. **Choose Collect Map from the Collect menu of the Atlμs window to collect the spectra.**

   Before each spectrum is collected, the system automatically adjusts the aperture to the stored settings.

Specifying an ordered array

ordered array A set of discrete sample points whose locations correspond to regularly spaced samples on a microscope slide or other surface.

You can use the sample point tool to specify an ordered array of discrete sample points at which you want to collect spectra. Follow these steps:

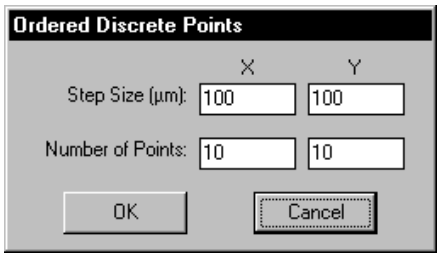
1. **Select the sample point tool.**

2. **Hold down the Shift key and click the position in the navigation pane or video pane where you want the lower-left corner of the array to be located.**

   This should normally be the location of a sample.

   The pointer changes to look like this when you move it into the pane:

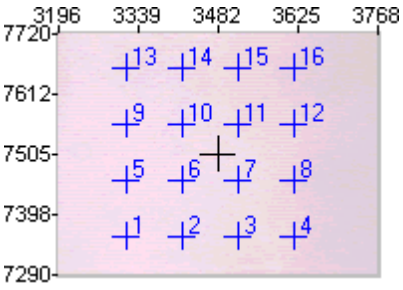
When you click the position, the Ordered Discrete Points dialog box appears asking for the step sizes (in micrometers) in the X and Y directions and for the number of points in both directions.



3. **Type the desired step sizes and number of points in the text boxes.**

4. **Choose OK. The ordered array appears in the pane.**

   Here is an example:



Note You can use the right mouse button to click a location in the navigation pane or video pane for the background point for the map. A cross hairs marker with the letter "B" appears, replacing any previously specified background point. The next time you use Map Setup, the information for the specified background point will appear on the Dimensions tab. See "Setting up data collection" in the "Atlµs Window Menus" chapter for details. ▲

To clear all the points and start over, choose Clear from the Edit menu of the Atlµs window. See “Clearing a map sequence” in the “Atlµs Window Menus” chapter for complete information.

Specifying a background point with the sample point tool

You can use the sample point tool to specify a background point for the discrete points you have specified with the tool (or for a line map or area map). Follow these steps:

1. **Select the sample point tool.**

2. **Use the right mouse button to click a location in the navigation pane or video pane for the background point.**

   The pointer changes to look like this when you move it into the pane:

   A cross hairs marker with the letter “B” appears at the clicked location, replacing any previously specified background point.

   The next time you use Map Setup, the information for the specified background point will appear on the Dimensions tab. See “Setting up map collection” in the “Atlµs Window Menus” chapter for details.

   You can move any point by using the arrow tool. See “Moving a discrete sample point or background point” earlier in this chapter for details.

To clear all the points and start over, choose Clear from the Edit menu of the Atlμs window. See “Clearing a map sequence” in the “Atlμs Window Menus” chapter for complete information.

Specifying a background point

The background point tool lets you graphically specify where on the sample to collect a background spectrum for a map or discrete point data collection. You can specify the point in either the navigation pane or video pane. The point replaces any background that is currently displayed in these panes.

background point A location on a sample or other material at which a background spectrum is collected.

Follow these steps to specify a background point:

1. **Select the background point tool.**

2. **Click the location in the navigation pane or video pane where you want to specify the background point.**

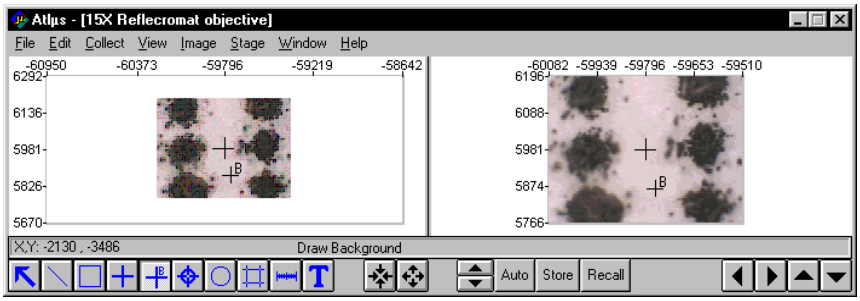
   The pointer changes to look like this when you move it into the pane:

As you move the mouse, the X and Y stage coordinates of the tool location appear in the description bar.

When you click the background point location, a cross hairs marker with the letter “B” appears at the location, replacing any previously specified background point.

When you specify a background point in the navigation pane or video pane, the point appears in both panes (if present), although you may need to use the arrow tool or zoom buttons to zoom in to see the point in the navigation pane. See “Zooming in on an area in the navigation pane” or “Using the zoom buttons” for more information.

The following illustration shows a background point in the navigation and video panes:



You can move the background point by using the arrow tool. See “Moving a discrete sample point or background point” earlier in this chapter for details.

The next time you use Map Setup, the information for the specified background point will appear on the Dimensions tab. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

To clear the background point and all the sample points, choose Clear from the Edit menu of the Atlμs window. See “Clearing a map sequence” in the “Atlμs Window Menus” chapter for complete information.

Note There are four other ways to specify a background point: You can enter X and Y values for the point in the Map Setup dialog box, and you can specify the point using the line map tool, area map tool or sample point tool. See "Setting up data collection" in the "Atlμs Window Menus" chapter or the sections describing the tools in this chapter for more information. ▲

Moving the stage by clicking a point

The stage movement tool lets you quickly move the stage to position a specified point under the microscope objective. The point becomes the center of the video image in the video pane (if present).

Follow these steps to move the stage:

1. **Select the stage movement tool.**

2. **Click the point in the navigation pane or video pane that you want positioned under the microscope objective.**

   The pointer changes to look like this when you move it into the pane:

As you move the mouse, the X and Y stage coordinates of the tool location appear in the description bar.

   When you click the point, the stage moves as needed to position the point under the objective. If the video pane is present, the video image is redisplayed with the point at the center, and the video pane axes are adjusted accordingly. The clicked point is also marked with cross hairs in the navigation pane.

Note You can also move the stage by using the stage movement buttons. See "Changing the view with the stage movement buttons" for more information. ▲

Note The stage movement tool is useful for verifying that the video image is calibrated and that the X and Y axes are set correctly. Use the tool to click a location in the video pane. If that location moves to the center of the video pane, the calibration and settings are correct. ▲

Note You can use the arrow tool to "revisit" a discrete point to view it again. See "Revisiting a discrete point" for details. ▲

Drawing a circular aperture

Use the circular aperture tool to draw a circular aperture in the video pane. The drawn aperture is always centered about the cross hairs in the pane, which reflect the current stage position.

Note The circular aperture tool is available only if circular apertures can be used with your microscope. ▲

Note You can also enter an aperture size on the Aperture tab in the Map Setup dialog box. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details. ▲

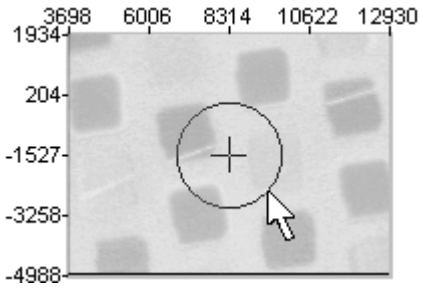
Follow these steps to draw a circular aperture:

1. **Install a circular aperture of the appropriate size in the microscope and focus so that the aperture is clearly visible in the video pane.**

2. **Select the circular aperture tool.**

3. **Using the mouse, drag within the video pane to draw the aperture.**

   As you move the mouse, the diameter of the drawn aperture changes. The distance from the cross hairs to the pointer is the radius.



Enlarging the video pane with 320 x 240 or 640 x 480 in the Image menu can make it easier to draw the aperture the desired size.

   The diameter in micrometers appears in the description bar as you move the mouse.

   You should normally draw the aperture the same size as the aperture being used in the microscope. To do this, simply make the drawn aperture the same size as the image of the installed aperture on the screen.

4. **When the drawn aperture is the desired size, release the mouse button.**

   Any drawn aperture that was displayed before is replaced by the new one.

   The next time you use Map Setup, the dimensions of the aperture you drew will appear on the Aperture tab. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

   You can resize the drawn aperture with the arrow tool. See “Resizing a drawn circular aperture” for details.

Drawing a rectangular aperture

Use the rectangular aperture tool to draw a rectangular aperture in the video pane. The drawn aperture is always centered about the cross hairs in the pane, which reflect the current stage position.

Note If you have a Continuμm microscope with the optional automated Reflex aperture system, the rectangular aperture tool is not needed and therefore not available. See "Adjusting the automated Reflex aperture on a Continuμm microscope" for information on adjusting the aperture. ▲

Note You can also enter an aperture size on the Aperture tab in the Map Setup dialog box. See "Setting up data collection" in the "Atlμs Window Menus" chapter for details. ▲

Follow these steps to draw a rectangular aperture:

1. **Install a rectangular aperture in the microscope and focus so that the aperture is clearly visible in the video pane.**

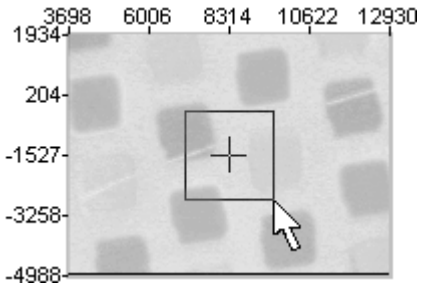
   If the aperture is adjustable, adjust its size and shape as desired.

2. **Select the rectangular aperture tool.**

3. **Using the mouse, drag within the video pane to draw the aperture.**

   As you move the mouse, the size and shape of the drawn aperture changes. The pointer is located at one of the four corners.

Enlarging the video pane with 320 x 240 or 640 x 480 in the Image menu can make it easier to draw the aperture the desired size.



   The X and Y dimensions in micrometers appear in the description bar as you move the mouse.

   You should normally draw the aperture the same size and shape as the aperture being used in the microscope. To do this, simply make the drawn aperture the same size and shape as the image of the installed aperture on the screen.

   You can rotate the drawn aperture if necessary later using the arrow tool. See “Rotating a drawn rectangular aperture” for more information.

4. **When the drawn aperture is the desired size and shape, release the mouse button.**

   Any drawn aperture that was displayed before is replaced by the new one.

   The next time you use Map Setup, the dimensions of the aperture you drew will appear on the Aperture tab. See “Setting up data collection” in the “Atlμs Window Menus” chapter for details.

You can resize the drawn aperture with the arrow tool. See “Resizing a drawn rectangular aperture” for details.

Displaying a ruler

You can use the ruler tool to display a ruler in the video pane for measuring items in the pane. For example, if you want to measure the length of an item, you can draw a ruler alongside the item and the same length as the item. The length of the ruler displayed in the description bar is then the length of the item.

Follow these steps:

1. **Select the ruler tool.**

2. **Point to the location in the video pane where you want the ruler to start.**

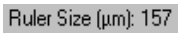
   The pointer changes to look like this when you move it into the pane:

If there is currently no ruler in the pane, the X and Y stage coordinates of the pointer location appear in the description bar.

3. **Press and hold down the mouse button.**

4. **Move the pointer to the location where you want the ruler to end.**

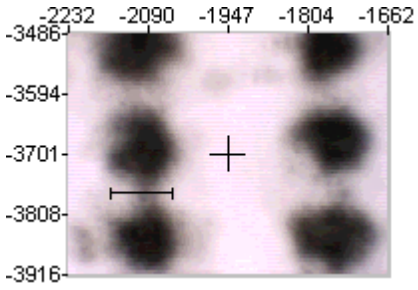
   The ruler changes in length and direction as you move the mouse. The length of the new ruler in micrometers appears in the description bar:



5. **Release the mouse button.**

   If there was a ruler displayed in the pane, it is replaced by the new ruler.

   Here is an example of a ruler drawn in the video pane:



   You can move or resize the ruler with the arrow tool. See "Moving the ruler" or "Resizing the ruler" for details.

Adding text annotation to the video image

You can use the text tool to add text annotation to the video image in the video pane. Depending on the setting of Connect Text Annotation With Line in the Options dialog box, the text may be connected to the annotated item with a line.

Adding text annotation that is not connected with a line

Follow these steps to use the text tool to add text annotation that is not connected to the displayed item with a line:

1. **Use Options in the Edit menu to turn off Connect Text Annotation With Lines.**

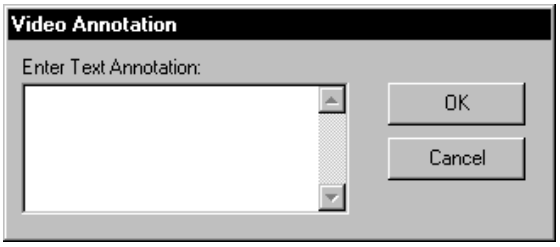
   See "Connecting text annotation with a line" in the Atlµs Window Menus" chapter for details.

2. **Select the text tool.**

3. **Click the location in the video pane where you want the text to begin.**

   The pointer changes to look like this when you move it into the pane:

   When you click the location, a dialog box appears:

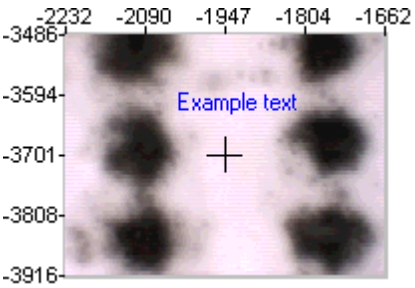


4. **Type the desired text.**

   Pressing Enter on the keyboard begins a new line of text.

5. **Choose OK.**

   The text annotation appears in the pane. Here is an example:



Adding text annotation that is connected with a line

Follow these steps to use the text tool to add text annotation that is connected to the displayed item with a line:

1. **Use Options in the Edit menu to turn on Connect Text Annotation With Lines.**

   See “Connecting text annotation with a line” in the Atlμs Window Menus” chapter for details.

2. **Select the text tool.**

3. **Move the pointer over the location in the video pane where you want the line to begin.**

   The pointer changes to look like this when you move it into the pane:

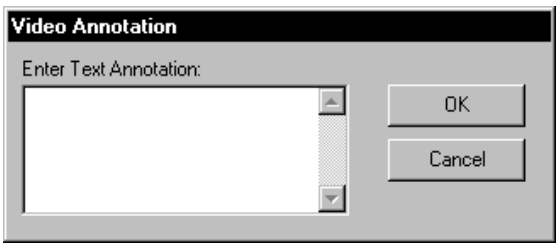
As you move the mouse, the X and Y stage coordinates of the tool location appear in the description bar.

4. **Press and hold down the mouse button, and then move the pointer to the location where you want the line to end and the text to begin.**

   The line changes in length and direction as you move the mouse.

5. **Release the mouse button.**

   A dialog box appears:

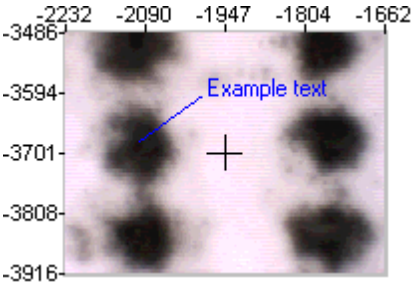


6. **Type the desired text.**

   Pressing Enter on the keyboard begins a new line of text.

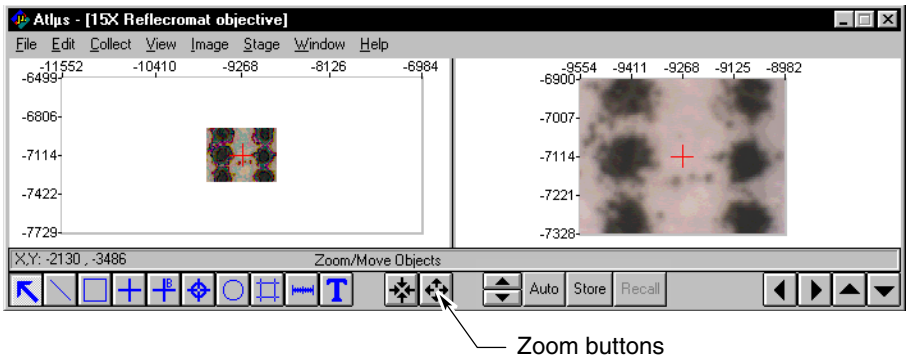
7. **Choose OK.**

   The text annotation and connecting line appear in the pane. Here is an example:



Using the zoom buttons

The zoom buttons let you quickly zoom in on the area of the stage you are viewing in the navigation pane or zoom out from the stage to see a larger area. The buttons are located to the right of the tool palette:



When you click the zoom out button, the area of the stage represented in the navigation pane is increased by 25% and the pane axes are updated to match the new area. The maximum size of the stage area represented by the pane is the maximum travel allowed by your Thermo Spectra-Tech stage controller.

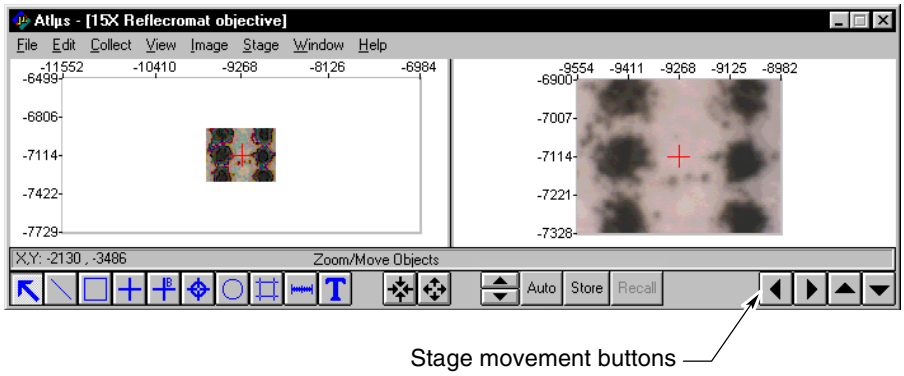
Click the zoom in button to zoom in on the area of the stage you are viewing. The cross hairs indicate the center of the area. Each time you click the button, the area represented in the navigation pane is reduced by 25% and the pane axes are updated to match the new area.

Note The zoom buttons are available only if Match Video is turned off in the View menu. See "Matching the navigation pane to the video pane" in the "Atlµs Window Menus" chapter for more information. ▲

Note You can also zoom in on an area by using the arrow tool. See "Zooming in on an area in the navigation pane" for details. ▲

Changing the view with the stage movement buttons

Use the stage movement buttons to move the stage. The buttons are located below the video pane:



The distance the stage moves when you click a stage movement button depends on the dimensions of the video field of view and the direction of movement. Each time you click a button, the stage moves one full video frame. The video pane axes change to reflect the new stage coordinates represented by the pane.

Click this button to move the stage to the right in order to see a portion of the sample that is to the left of the displayed video frame. The stage X coordinates decrease.

Click this button to move the stage to the left in order to see a portion of the sample that is to the right of the displayed video frame. The stage X coordinates increase.

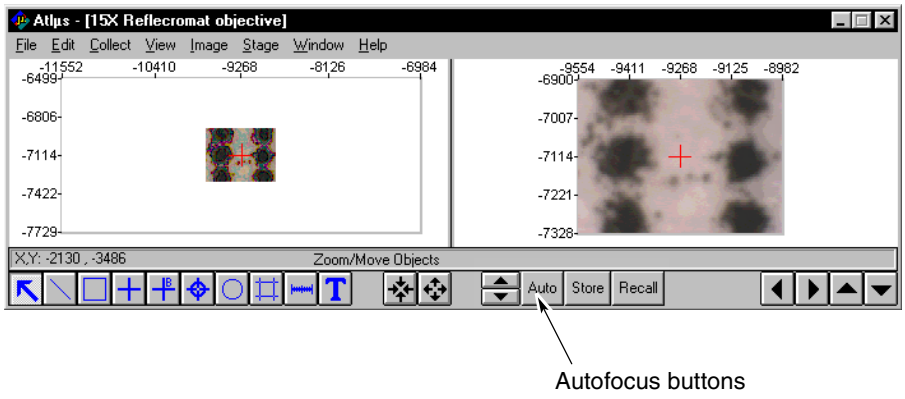
Click this button to move the stage toward the front in order to see a portion of the sample that is “above” the displayed video frame. The stage Y coordinates increase.

Click this button to move the stage toward the rear in order to see a portion of the sample that is “below” the displayed video frame. The stage Y coordinates decrease.

Note You can also move the stage by using the stage movement tool or Move Stage in the Stage menu. See “Moving the stage by clicking a point” in this chapter or “Moving the stage to a specified point or by specified steps” in the “Atlμs Window Menus” chapter for details. ▲

Using the focus buttons

If you have the required hardware feature, you can use the focus buttons to focus the microscope. The buttons are located below the video pane:



Click the up arrow button to move the stage up. Click the down arrow button to move the stage down. If you want the stage to move faster, hold down the Shift key when you click one of the buttons.

Important Be careful not to hit the objective with the sample or stage when using the up arrow button. ▲

If you click the Auto button (requires the optional autofocus hardware), the system focuses on the sample automatically by moving the stage up or down (a maximum of 1 mm).

Click the Store button to save the Z (vertical axis) coordinate of the current stage position so that you can return to it later with the Recall button.

Click the Recall button to move the stage to the Z coordinate that was last saved with the Store button. The Recall button is available only if the Store button has been used to save the Z coordinate.

4 Map Windows

OMNIC Atlμs uses map windows to display collected line maps and area maps along with associated software features such as a video image of the sample and a 3-D display of the map data.

A separate map window is used for each map you display. After you collect a map or open a stored map, it is displayed in a new map window.

The features provided in a map window vary depending on the type of map data being displayed. The following sections describe how to use map window features to work with different types of map data.

An important feature of a map window is the “interlinking” of the video image, the contour map and the 3-D display. When you click a location in any one of these displays, the cross hairs in the video image, the spectral cursor in the contour map, and the red cube in the 3-D display all move to the corresponding point in their displays. The spectrum that corresponds to the clicked point also appears in the spectral display pane. This allows you to see the relationship between data displayed in different ways.

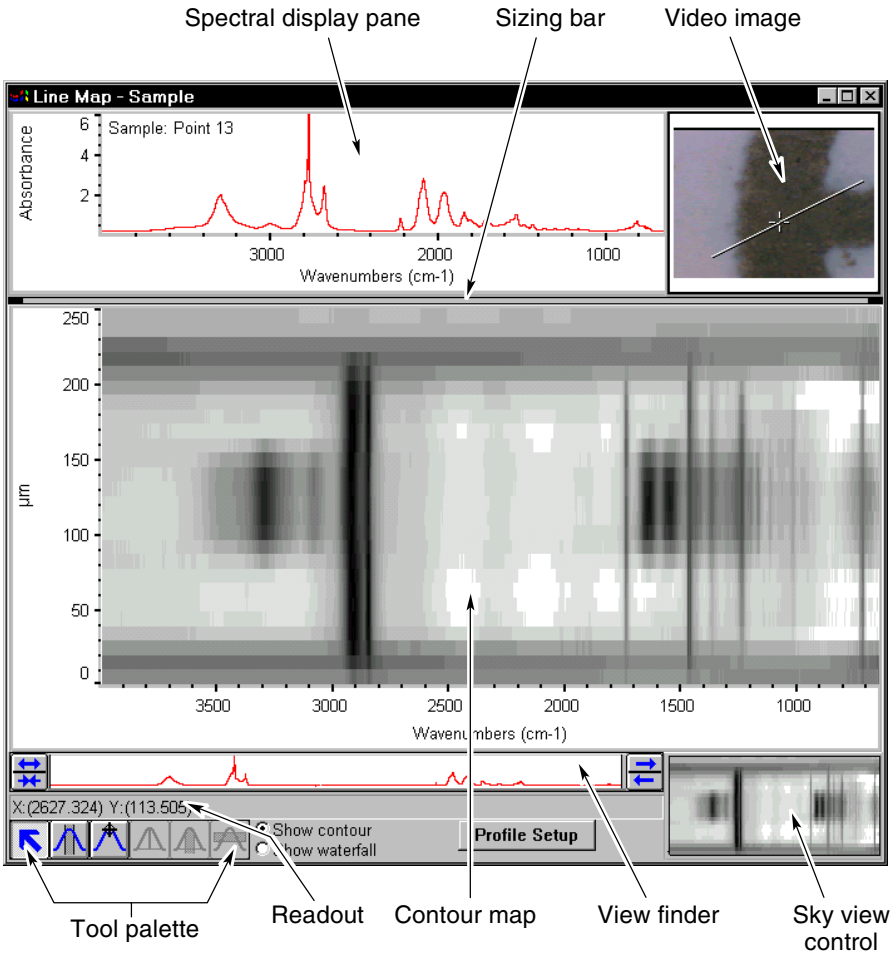
Displaying line map data

When you display a line map in a map window, you have the choice of displaying the data in the form of a contour map, with spectral intensities represented by areas of different color, or as a “waterfall,” a three-dimensional display showing spectra in consecutive order. These are explained in the next sections.

Displaying a line contour map

Show contour

Select the Show Contour option at the bottom of the map window to display line map data as a contour map. The illustration below shows a line contour map with the available map window features.



Line contour map in a map window

line contour map A representation of line map data in three dimensions: spectral intensity (shown by colors), spectral frequency (indicated by the X-axis) and distance on the sample from the starting point (indicated by the Y-axis).

The contour map is a graphical representation of the spectral intensity of the series of map spectra. Intensities are indicated on the map by "contours," areas displayed using single colors. The intensity within each contour is limited to a range of values determined by the settings of the contour display parameters. To view a color key showing the value ranges of the contour colors, choose Display Options from the Atlμs menu. See "Setting the display options" in the "Atlμs Menu Commands" chapter for more information on using the color key.

The X-axis of the contour map is in wavenumbers or Raman-shifted wavenumbers and represents the frequencies at which spectral bands occur. The Y-axis is in micrometers and represents the distance from the first sample point at which each spectrum in the map was collected.

Together, the contour colors and axes present a view of the map data in three dimensions: spectral intensity (shown by the colors) at different frequencies (indicated by the X-axis) at different distances on the sample from the starting point (indicated by the Y-axis). (If you create a profile from a line map, the result has two dimensions: spectral intensity and frequency.

At the top of the map window is a spectral display pane for displaying a single map spectrum. See "The spectral display pane for line maps" for more information on the spectral display pane.

If Show Video Image is turned on in the Display Options dialog box, a video image of the sample is displayed to the right of the spectral display pane. The pane is resized to make room for the image. See "Displaying the video image for a line map" for more information on using this feature.

The view finder displays an image of the spectrum contained in the spectral display pane. The view finder works the same as the view finder in other OMNIC windows (see the OMNIC Help system for details). If you display a different spectral region using the view finder, both the spectrum and the contour map are affected. If you use the spectral cursor tool or video image to display a different map spectrum, the image displayed in the view finder changes to match the spectrum.

The tool palette provides tools for manipulating the displayed data. The use of the tools is explained in the section called “Using the tool palette.”

Above the palette is a readout that displays information related to the use of the tools. The “Using the tool palette” section explains the information displayed by the readout.

The sky view control lets you quickly change the display of line map data. See “Adjusting the display with the sky view control” for details.

The contour map and the spectral display pane above it are separated by the sizing bar. You can drag the bar up or down to allocate more or less space to the two areas.

The spectral display pane for line maps

The line map spectrum contained in the spectral display pane of a map window corresponds to the location of the cross hairs in the video image, if displayed, and to the Y position of the spectral cursor in the contour map, if you have displayed the spectral cursor using the spectral cursor tool. See “Displaying a spectrum from a map” for details on displaying map spectra using the spectral cursor tool.

The pane has its own Y-axis, just as in a spectral window. If you are not displaying the video image (Show Video Image is turned off in the Display Options dialog box or the system does not have the optional video capability), the X-axis of the contour map also applies to the pane. If you are displaying the video image, the pane has its own X-axis.

In the upper-left corner of the pane is the map title followed by text indicating at which sample point the spectrum was collected. Here is an example:

In this example, the map title is “Example line map” and the spectrum is from the tenth sample point in the map.

Example line map: Point 10 @ (53439.3, 16637)

You can copy the displayed spectrum to the Clipboard and then paste it into a spectral window. See the OMNIC Help system if you need information on using the Copy and Paste commands.

Displaying the video image for a line map

You can set the software to display a video image of the sample in the upper-right corner of a map window. The spectral display pane is reduced in size to create room for the image. See "Setting the display options" in the "Atlμs Menu Commands" chapter for details on setting the software to display the image.

Here is an example of a video image:

The location of the line formed by the sample points is indicated in the video image by a white line. Cross hairs indicate the location of the sample point that corresponds to the currently displayed spectrum.

To display the spectrum collected at a point on the sample, use the selection tool to click the point in the video image. This has the same effect as using the spectral cursor tool to click a point in the contour map. The spectrum corresponding to the clicked point appears in the spectral display pane, the cross hairs move to the sample point in the video image, and the spectral cursor, if displayed, moves to the appropriate point in the map.

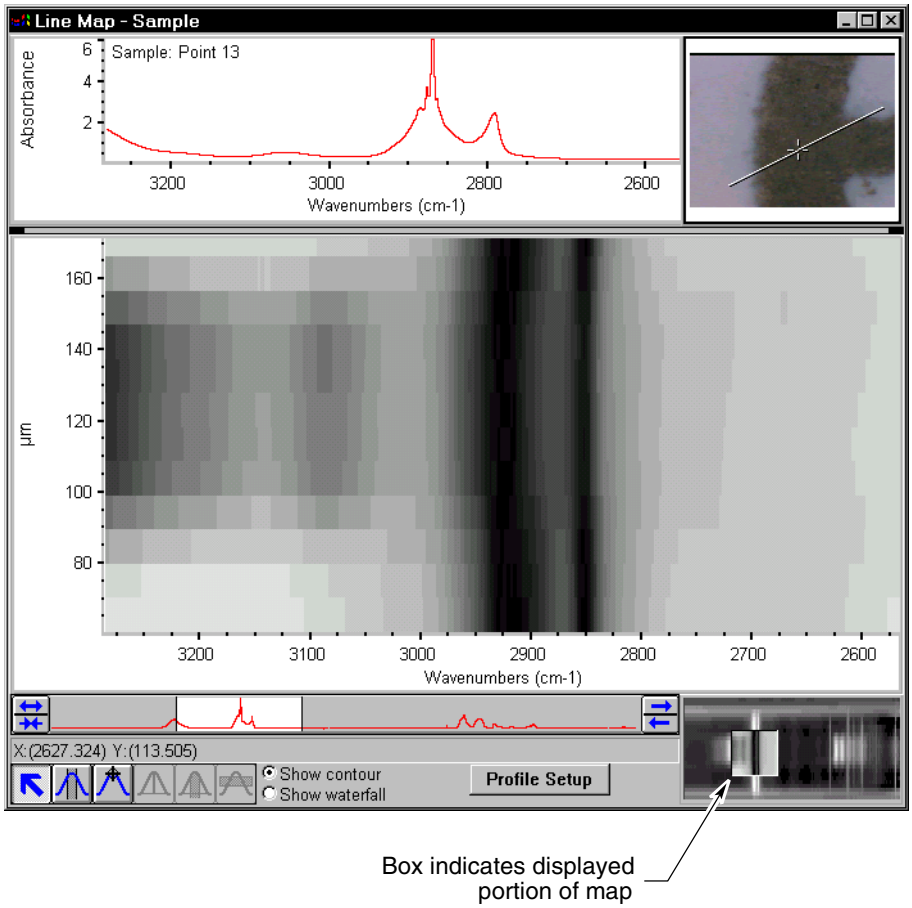
The size of the sample area shown in the video image depends on which microscope objective was used to view the sample and save video images. If the entire area from which the map was collected is too large to fit in the video image at once, the software displays the portion containing the sample point corresponding to the currently displayed spectrum. To bring another portion into view, use the spectral cursor tool to click a location in the contour map.

Adjusting the display with the sky view control

The sky view control in the lower-right corner of a map window lets you quickly change the display of line map data in several ways. You may prefer to use this control instead of the view finder to adjust the display, especially if you want to change the display limits of both axes.

The sky view control is always filled with a reduced image of the entire contour map. Within the control is a box that indicates the portion of the map that is currently visible in the large contour map display. The colors inside the box are displayed in normal video in the control; the colors in the area outside the box are displayed in reverse video in the control. If the entire map is currently visible in the large map display, the box fills the sky view control.

Here is an example showing how the sky view control indicates the displayed area of a line map:



When you change the display using the sky view control, the spectrum and spectral region shown in the spectral display pane and view finder are changed to match the box.

Use the instructions that follow to adjust the display using the sky view control.

Displaying a different area of the same size – There are two ways to do this. You can simply drag the box to the desired location. As you drag the box, an outline remains in the original location until you release the mouse button, and the new X and Y display limits are shown in the readout above the palette.

You can also click a point outside the box. The new display area is centered at the point you clicked.

Changing an X or Y display limit – Drag any side of the box to change the display limit that corresponds to that side. As you drag the side, a line moves with the pointer to indicate the new location of the side, and the new X and Y display limits are shown in the readout above the palette.

Changing the size and shape of the displayed area – Drag any corner of the box to change either the box's size or shape or both. As you drag the corner, lines move with the pointer to indicate the new locations of the two sides that form the corner, and the new X and Y display limits are shown in the readout above the palette.

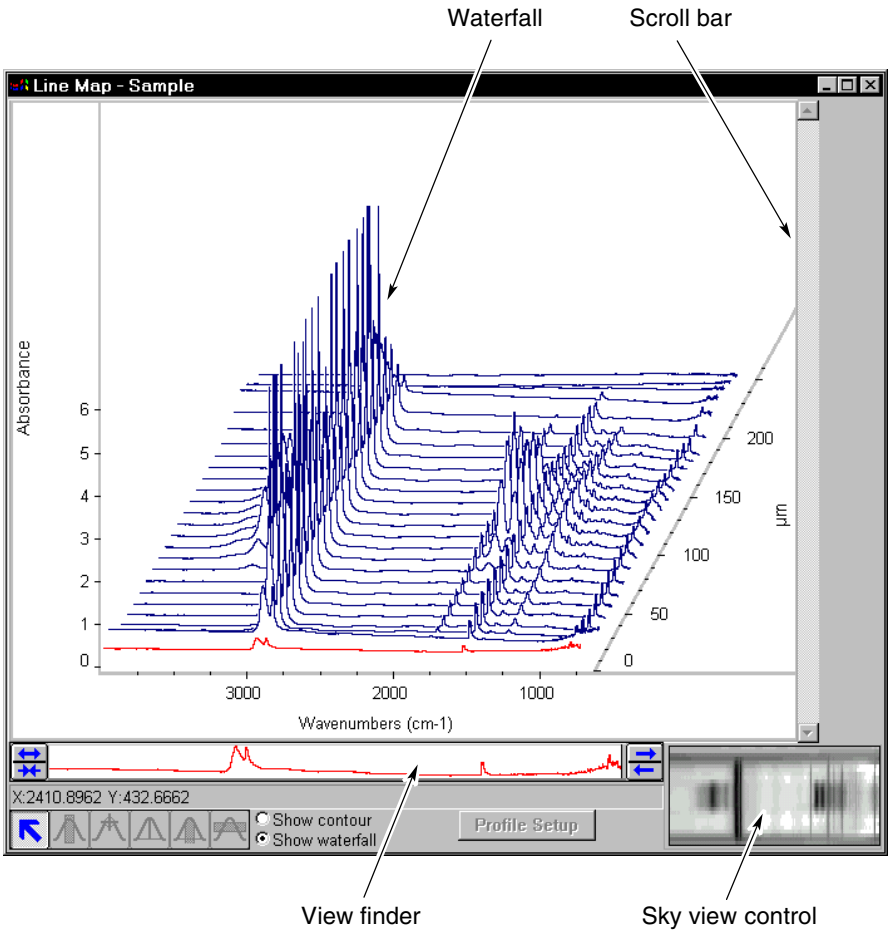
Displaying the entire map – To display the entire map, double-click inside the box.

Displaying waterfall data

waterfall A three-dimensional display of map spectra that makes it easy to see changes in spectral intensity.

When you are working with a line map, you can select the Show Waterfall option at the bottom of the window to view a "waterfall" for the map. A waterfall is a three-dimensional display that shows the spectra from a map in consecutive order. This type of display makes it easy to see changes in spectral intensity that are present in the series of spectra. Here is an example showing the waterfall for a line map:

Selected spectra appear in red (or other color specified in OMNIC for displaying selected spectra).



The X-axis and Y-axis are similar to the axes in spectral windows. Because the spectra are offset on the screen in order to give an appearance of depth, the values on the X-axis and Y-axis can be directly applied only to the bottom spectrum.

The third dimension of the display, represented by the Z-axis, is distance in micrometers from the first sample point. The spectrum at 0 on the Z-axis is the first spectrum in the map; this spectrum is normally displayed at the "front" of the waterfall. If Reverse View is turned on in the Display Options dialog box, the order of spectra is reversed and the first spectrum appears at the "back" of the waterfall. Reversing the view can make it easier to see hidden peaks in some spectra. See "Setting the display options" in the "Atlμs Menu Commands" chapter for details on turning Reverse view on or off.

You can use the sky view control to adjust the waterfall display in both the X and Z dimensions. The reduced image of the contour map contained in the control corresponds to a view of the waterfall "looking down" at the X-Z plane. (Because of the three-dimensional appearance of the waterfall, the X-Z plane in the waterfall is in the shape of a parallelogram on the screen.)

The box in the sky view control indicates which portion of the map data is displayed in the waterfall. Use the techniques described in the section called "Adjusting the display with the sky view control" to display the desired data.

The scroll bar at the right side of the window shows the total range of distance for the map, expressed in micrometers. The number at bottom of the scroll bar is 0.0 (for the position of the first sample point), the number at the top is the distance value for the last sample point, and the number at the middle is the distance value for the sample point that corresponds to the bottom spectrum (or top spectrum if Reverse View is turned on in the Display Options dialog box).

If the scroll bar is active, you can press the up and down arrow keys on the keyboard to scroll the spectra.

To display the spectra from a different portion of the map using the scroll bar, drag the scroll box, click the scroll arrows or click inside the scroll bar to scroll the data. The number of spectra displayed will remain the same.

You can use the view finder below the waterfall to adjust the X-axis display limits just as you would in a spectral window (see the OMNIC Help system for details). To get a better view of the peaks of interest, display just the spectral region that contains those peaks. An image of the selected spectrum appears in the view finder.

You can copy the selected spectrum or spectra to the Clipboard and paste them into a spectral window in order to view them better or to print them.

Use the following techniques to select and deselect spectra:

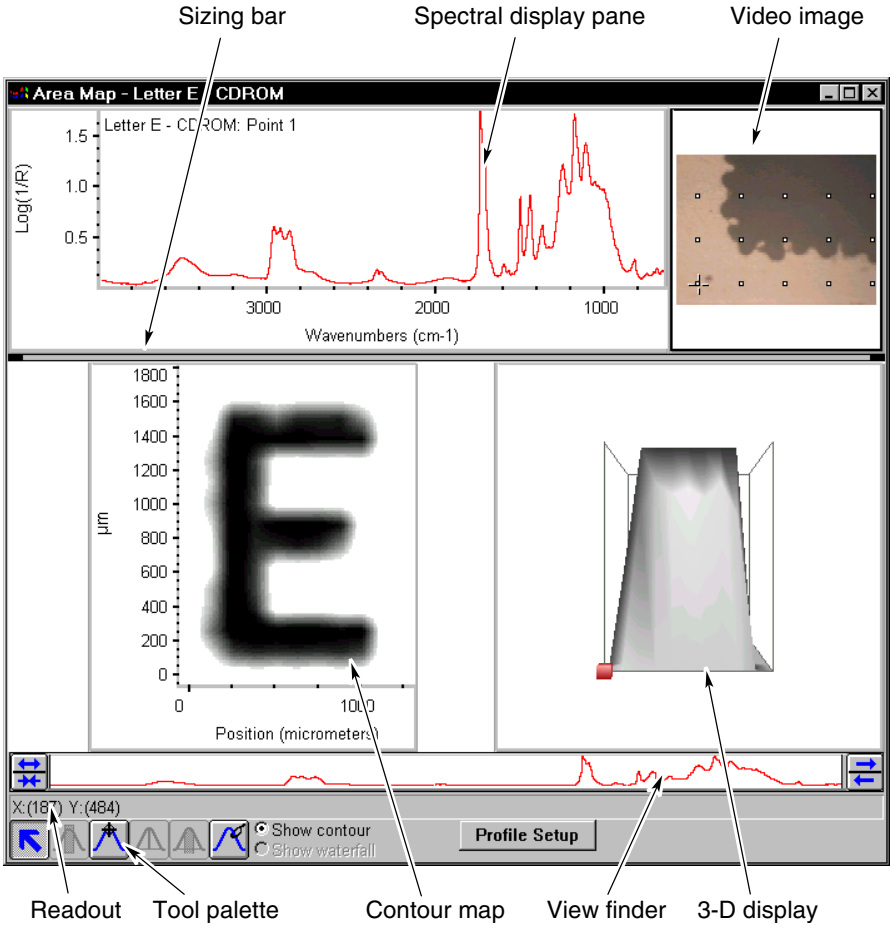
- To select a single spectrum, click it.
- If a spectrum is selected and the waterfall is active, you can select a different spectrum by pressing the up and down arrow keys on the keyboard. Press the up arrow key to select the spectrum above the currently selected spectrum; press the down arrow key to select the spectrum below the currently selected spectrum.
- To select more than one consecutive spectrum, click the first spectrum you want to select and then hold down the Shift key and click the last spectrum you want to select. The two spectra and all those between are selected.
- To select multiple spectra that are not consecutive, hold down the Control key while clicking the desired spectra.
- If a spectrum is selected, you can deselect it by clicking it again while holding down the Control key.

After you have selected one or more spectra, you can copy them and paste them into a spectral window. See the OMNIC Help system if you need information on using the Copy and Paste commands.

If you want to see or change the waterfall display option settings while you are viewing a waterfall, choose Display Options from the Atlμs menu. See “Setting the display options” in the “Atlμs Menu Commands” chapter for more information on the options.

Displaying area map data

When you display an area map in a map window, the window contains the features shown in the illustration below.



Area contour map in a map window

area contour map A graphical representation of area map data depicted in three dimensions: profile value (shown by colors), X position on the sample and Y position on the sample.

The contour map is a graphical representation of the profile values at points in the map. Typically an area contour map indicates chemical composition at different locations on the sample. (See “Creating a profile” for a description of all the available profile types.) The profile values are indicated on the map by “contours,” areas displayed using single colors.

The intensity within each contour is limited to a range of values determined by the settings of the contour display parameters. To view a color key showing the value ranges of the contour colors, choose Display Options from the Atlμs menu. See "Setting the display options" in the "Atlμs Menu Commands" chapter for more information on using the color key.

Note If you did not specify a profile type before collecting the map, the default type, Chemigram™, is used for the initial area contour map, and the contour colors represent overall spectral intensity at the sample points. ▲

The X-axis of the contour map is in micrometers and represents the X position (on the microscope stage) of the sample points where each map spectrum was collected. Similarly, the Y-axis of the contour map is in micrometers and represents the Y position of the sample points.

The scales of the axes are automatically adjusted so that the aspect ratio (proportions) of the contour map matches the video image. This makes it easy to identify corresponding locations in the contour map and video image.

Together, the contour colors and axes present a view of the map data in three dimensions: profile value (shown by the colors) at different X positions (indicated by the X-axis) and different Y positions (indicated by the Y-axis).

The spectral display pane at the top of the window shows individual spectra collected at the sample points. See "The spectral display pane for area maps" for more information on the spectral display pane.

If Show Video Image is turned on in the Display Options dialog box, the video image of the sample is displayed to the right of the spectral display pane. The pane is resized to make room for the image. See "Displaying the video image for an area map" for more information on using this feature.

The 3-D display shows a three-dimensional image of the map data that makes it easy to see variances in spectral intensity or profile value across the sample. The 3-D image appears only if Show 3-D Image is turned on in the Display Options dialog box. See “Using the 3-D display” for complete information.

The view finder displays an image of the spectrum contained in the spectral display pane. The view finder works the same as the view finder in other OMNIC windows (see the OMNIC Help system for details). If you use the spectral cursor tool or video image to display a different map spectrum, the image displayed in the view finder changes to match the spectrum.

The display of the contour map is not affected by the view finder; unlike a line contour map, an area contour map is always displayed in its entirety.

The tool palette provides tools for manipulating the displayed data. The use of the tools is explained in the section called “Using the tool palette.”

Above the palette is a readout that displays information related to the use of the tools. The “Using the tool palette” section explains the information displayed by the readout.

The contour map and the spectral display pane above it are separated by the sizing bar. You can drag the bar up or down to allocate more or less space to the two areas.

The spectral display pane for area maps

The area map spectrum contained in the spectral display pane corresponds to the location of the cross hairs in the video image, if displayed, and to the location of the spectral cursor in the contour map, if you have displayed the spectral cursor using the spectral cursor tool. See “Displaying a spectrum from a map” for details on displaying map spectra using the spectral cursor tool.

The pane has its own X-axis and Y-axis, just as in a spectral window.

In the upper-left corner of the pane is the map title followed by text indicating at which sample point the spectrum was collected. Here is an example:

In this example, the map title is "Example area map" and the spectrum is from the tenth sample point in the map.

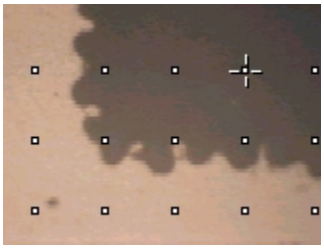
Example area map: Point 10 @ (53439.3, 16637)

You can copy the displayed spectrum to the Clipboard and then paste it into a spectral window. See the OMNIC Help system if you need information on using the Copy and Paste commands.

Displaying the video image for an area map

You can set the software to display a video image of the sample in the upper-right corner of the map window. The spectral display pane is reduced in size to create room for the image. See "Setting the display options" in the "Atlμs Menu Commands" chapter for details on setting the software to display the image.

Here is an example of a video image:



The locations of the sample points are indicated in the video image by white dots. Cross hairs indicate the location of the sample point that corresponds to the currently displayed spectrum.

Note If the sample points are quite close together, the map will appear as a rectangle just as it did in the video pane of the Atlμs window when you defined the map. ▲

To display the spectrum collected at a point on the sample, use the selection tool to click the point in the video image. This has the same effect as using the spectral cursor tool to click a point in the contour map. The spectrum corresponding to the clicked point appears in the pane, the cross hairs move to the sample point in the video image, and the spectral cursor, if displayed, moves to the appropriate point in the map.

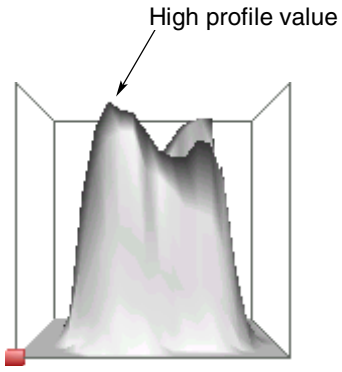
The size of the sample area shown in the video image depends on which microscope objective was used to view the sample and to collect data. If the entire area from which the map was collected is too large to fit in the video image at once, the software displays the portion containing the sample point corresponding to the currently displayed spectrum. To bring another portion into view, use the spectral cursor tool to click a location in the contour map.

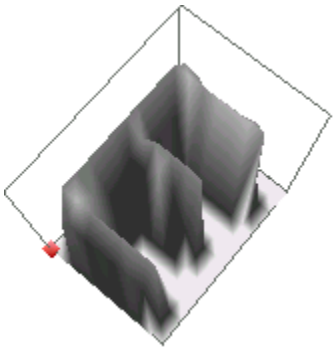
Note If you specified that the video images be saved before collecting the map, you can use Show Video Mosaic in the Atlμs menu to display the Mosaic. See "Displaying a stored Mosaic" in the "Atlμs Menu Commands" chapter. ▲

Using the 3-D display

If you have turned on Show 3-D Image in the Display Options dialog box (see "Displaying the 3-D image" in the "Atlμs Menu Commands" chapter), the 3-D display appears in the map window, to the right of the contour map. This display shows an image of the area map data in three dimensions: X position (on the microscope stage), Y position and profile value. The display is essentially a conversion of the contour map to a three-dimensional form that makes it easier to see the profile values across the sample. Instead of representing profile values by colors, the 3-D display uses peaks that "project up" from the X-Y plane. Like the area contour map, the 3-D display always shows data from the entire map.

The following are examples of 3-D displays from different area maps. The second example has been rotated to show the “shape” of the data more clearly.





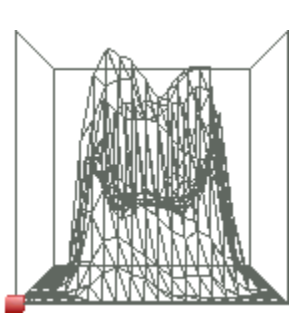
The outline of a box around the data serves as a reference for judging the size and position of data features. (Portions of the outline are left out so as not to obstruct your view of the data.)

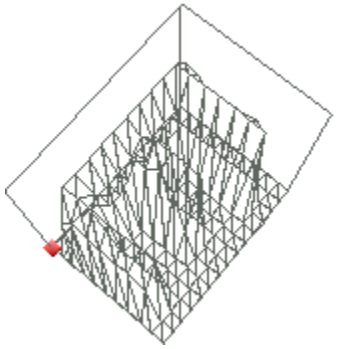
A small, red cube appears at the location of the sample point where the currently displayed spectrum was collected. If you use the spectral cursor tool to click a location in the contour map, the red cube moves to the corresponding location in the 3-D display.

You can rotate the 3-D display in any direction to see the data from different angles. Simply drag the image in the direction you want to rotate it; the image rotates as you move the mouse. Release the mouse button when you have displayed the desired view of the data. If you release the mouse button while the mouse is moving (and the image is still rotating), the image will continue to rotate. This can help you study the shape of the data from all sides.

You can click the image when it is stationary or rotating.

If you click the 3-D image with the right mouse button, a “wire-frame” version of the image appears. Here are our examples displayed as wire-frames:





You can rotate the wire-frame image in the same way as the solid image. To switch back to the solid image, click the wire-frame image with the right mouse button.

Using the tool palette

The tool palette in the lower-left corner of a map window contains tools for manipulating the display of map data and specifying peak information for creating profiles (see “Creating a profile” for details). The tools provided in the palette vary depending on whether the window contains line map data or area map data and which part of the window is active.

The following table shows which tool to use to perform operations that are special to Atlμs. See the OMNIC Help system for information on using palette tools for standard OMNIC operations.

Note When you perform some operations—for example, adjusting the display with the sky view control—the standard pointer appears, regardless of which palette tool is selected. ▲

To do this...	*Use this tool...*
Zoom in on a portion of a line map.	 selection tool
Select a spectral region.	 region tool
Display a spectrum from a map.	 spectral cursor tool
Specify a peak location and baseline.	 peak height tool
Specify a peak area and baseline.	 peak area tool
Specify a line map to be extracted from an area map.	 extraction tool

The next sections explain how to perform these operations. In all cases it is assumed that the appropriate part of the display is active and that the needed tool has already been selected. To make a part of the display active, click it. To select a tool, click it in the palette.

Note To make the spectral display pane active, you must click above the X-axis and to the right of the Y-axis. ▲

Zooming in on a portion of a line map

You can enlarge an area of a line contour map in the same way as you enlarge a portion of a spectrum in a spectral window. To do this, use the selection tool to draw a box around the area and then click inside the box. The X and Y values of the pointer location appear above the palette as you draw the box. See the OMNIC Help system if you need more information.

Note The selection tool also provides a convenient way to find profile values of area map contours. With the contour map active (click it to make it active), move the pointer over a contour; the profile value of that contour appears above the palette. ▲

Selecting a spectral region

Use the region tool to select a spectral region for creating a new profile or for truncating the map spectra (see “Truncating the spectral range of a map” in the “Atlμs Menu Commands” chapter for details on truncating spectra). If you are working with line map data, you can select the region in the spectral display pane or in the contour map. If you are working with area map data, you must select the region in the spectral display pane.

To select the region, drag horizontally across it within the spectral display pane or map display area just as you would in a pane in a spectral window.

In the spectral display pane, a selected spectral region is shaded gray and two vertical lines appear at its limits. In a line contour map, a selected spectral region appears in reverse video colors. The X limits and width of the region appear above the palette.

In the spectral display pane, you can drag the handles at the top of the vertical lines to the right or left to make the region larger or smaller. In a line contour map, you can drag the edges of the region to adjust it.

If you select a spectral region for creating a profile, the initial baseline endpoints will have the same X values as the limits of the region. (You can type different endpoints after using the region tool.) If you want to specify a different baseline graphically, use the peak area tool instead. You will be able to drag the baseline endpoints to the desired locations. See “Specifying peak areas and baselines” for more information.

Displaying a spectrum from a map

You can use the spectral cursor tool to display a map spectrum in the spectral display pane. Simply click the location of the spectrum in the contour map. If you are working with line map data, only the Y position of the clicked point matters; the X position is just a frequency value and is ignored. If you are working with area map data, both the X and Y values of the clicked point matter, since those values indicate the physical location of the sample point on the sample. The X and Y values of the clicked point appear above the palette.

Specifying peak locations and baselines

When you create a new profile using the Peak Height Of One Peak or Peak Height Ratio Of Two Peaks options, you can use the peak height tool to specify the peak or peaks graphically. The height and location of the peak and the X values of the baseline endpoints are displayed above the palette when you specify a peak with the tool. See “Creating a profile” for complete information on creating the profile.

Specifying a single peak

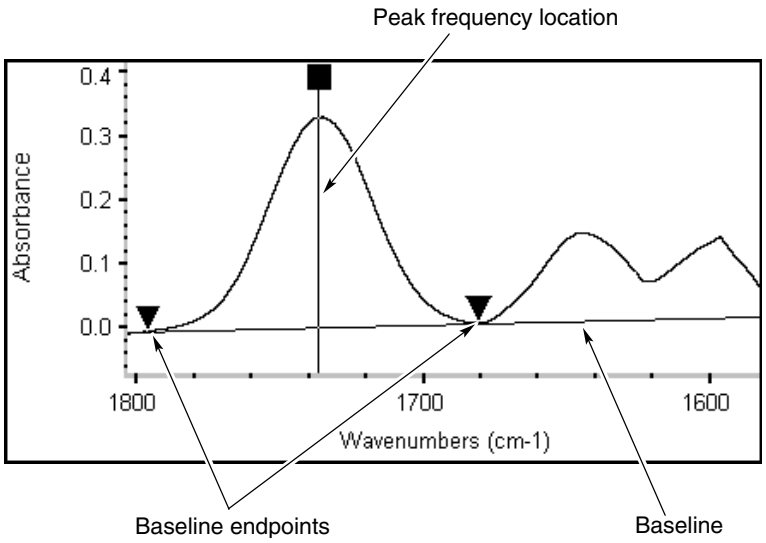
Use the following procedure to specify a single peak for the Peak Height Of One Peak Option (for creating a profile). You can specify the peak before you use the Profile Setup button or after you select the Peak Height Of One Peak option.

1. **Use the peak height tool to click the desired peak location in the spectral display pane.**

   A vertical line with a square handle appears at the clicked location. A baseline also appears with two triangular handles indicating the current baseline endpoints.

   Here is an example:

The frequency location of the peak and the frequency locations of the baseline endpoints appear in the readout above the palette.



2. **If desired, drag the vertical line by its handle to a new frequency location.**

   The frequency (X value) is continuously updated in the readout above the palette as you move the line. When you release the mouse button, the new frequency appears in the Peak box.

3. **If desired, adjust the baseline by dragging the endpoints to new frequency locations.**

   The frequency of the endpoint being moved is continuously updated in the readout above the palette (Baseline value) and in the appropriate Baseline box.

   When you are finished making adjustments, you can use the Create button or Replace button to create a profile.

Specifying two peaks

Follow these steps to specify two peaks for the Peak Height Ratio Of Two Peaks option (for creating a profile):

1. **After you select the Peak Height Ratio Of Two Peaks option (available through the Profile Setup button), use the peak height tool to click the desired peak location in the spectral display pane for the numerator peak.**

   Make sure there is a box around the Ratio Numerator parameters. The box indicates which of the two peaks you are specifying. If the box is around the Ratio Denominator parameters, click one of the text boxes for the Ratio Numerator parameters.

   When you click a peak location, a vertical line with a square handle appears at the clicked location. A baseline also appears with two triangular handles indicating the current baseline endpoints. See the illustration in the “Specifying a single peak” section for an example.

   The frequency location of the peak appears in the Peak box for the ratio numerator. The frequency locations of the baseline endpoints appear in the Baseline boxes.

2. **If desired, drag the vertical line by its handle to a new frequency location.**

   The frequency (X value) is continuously updated in the readout above the palette as you move the line. When you release the mouse button, the new frequency appears in the Peak box.

3. **If desired, adjust the baseline by dragging the endpoints to new frequency locations.**

   The frequency of the endpoint being moved is continuously updated in the readout above the palette (Baseline value) and in the appropriate Baseline box.

4. **When you are finished specifying the numerator peak, click one of the text boxes for the Ratio Denominator parameters.**

   A box then appears around the Ratio Denominator parameters to indicate that they are active.

5. **Specify the denominator peak in the same way as you specified the numerator peak.**

   The specified frequencies appear in the text boxes for the Ratio Denominator parameters.

   When you are finished making adjustments, you can use the Create button or Replace button to create the profile.

Specifying peak areas and baselines

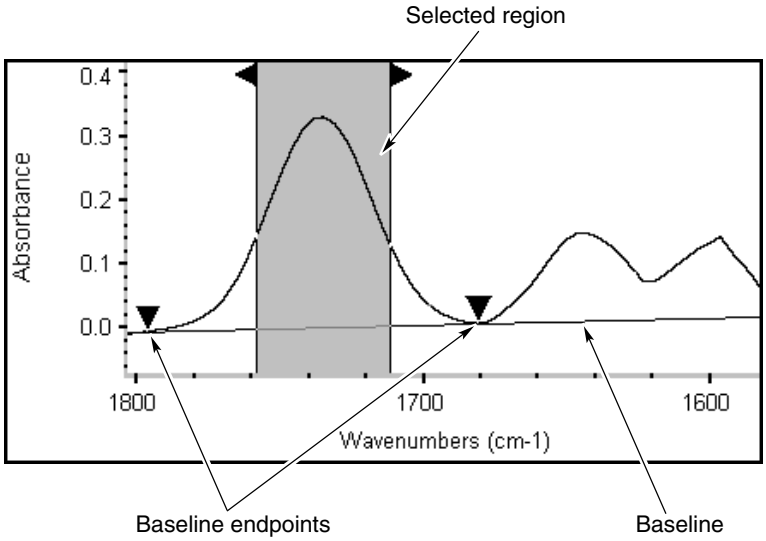
When you create a new profile using the Chemigram, Peak Area Of One Peak or Peak Area Ratio Of Two Peaks options, you can use the peak area tool to specify the peak or peaks graphically. (You can also use the region tool; see “Selecting a spectral region” for details.) The area, region limits and baseline endpoints are displayed above the palette when you specify a peak area with the tool. See “Creating a profile” for complete information on creating the profile.

Specifying a single peak area

Use the following procedure to specify the area of a single peak for the Peak Area Of One Peak option or to specify a spectral region for the Chemigram option (for creating a profile). You can specify the area before you use the Profile Setup button or after you select the profile type option.

1. **Use the peak area tool to drag across the desired peak or region in the spectral display pane.**

   The region you dragged across is shaded gray to indicate that it is selected. The region is bordered by vertical lines, each with a handle. A baseline also appears with two handles indicating the current baseline endpoints. Here is an example:



The frequency limits of the selected region appear in the Region boxes. The frequency locations of the baseline endpoints appear in the Baseline boxes. The area width and the X values of the region limits and baseline endpoints appear above the palette.

The peak area will be measured between the limits of the selected spectral region and above the baseline.

2. **If desired, adjust the limits of the selected region by dragging the vertical lines by their handles to new frequency locations.**

   The frequency (X value) of the region limit being moved is continuously updated in the readout above the palette. When you release the mouse button, the new frequency appears in the appropriate Region box.

3. **If desired, adjust the baseline by dragging the endpoints to new frequency locations.**

   The frequency of the endpoint being moved is continuously updated in the readout above the palette (Baseline value) and in the appropriate Baseline box.

   When you are finished making adjustments, you can use the Create button or Replace button to create the profile.

Specifying two peak areas

Follow these steps to specify the areas of two peaks for the Peak Area Ratio Of Two Peaks option (for creating a profile):

1. **After you select the Peak Area Ratio Of Two Peaks option (available through the Profile Setup button), use the peak area tool to drag across the desired peak region in the spectral display pane for the numerator peak.**

   Make sure there is a box around the Ratio Numerator parameters. The box indicates which of the two peaks you are specifying. If the box is around the Ratio Denominator parameters, click one of the text boxes for the Ratio Numerator parameters.

   The region you dragged across is shaded gray to indicate that it is selected. The region is bordered by vertical lines, each with a handle. A baseline also appears with two triangular handles indicating the current baseline endpoints. See the illustration in the “Specifying a single peak area” section for an example.

The frequency limits of the selected region appear in the Region boxes for the ratio numerator. The frequency locations of the baseline endpoints appear in the Baseline boxes.

The peak area will be measured between the limits of the selected spectral region and above the baseline.

2. **If desired, adjust the limits of the selected region by dragging the vertical lines by their handles to new frequency locations.**

   The frequency (X value) of the region limit being moved is continuously updated in the readout above the palette. When you release the mouse button, the new frequency appears in the appropriate Region box.

3. **If desired, adjust the baseline by dragging the endpoints to new frequency locations.**

   The frequency of the endpoint being moved is continuously updated in the readout above the palette (Baseline value) and in the appropriate Baseline box.

4. **When you are finished specifying the numerator area, click one of the text boxes for the Ratio Denominator parameters.**

   A box then appears around the Ratio denominator parameters to indicate that they are active.

5. **Specify the denominator area in the same way as you specified the numerator area.**

   The specified frequencies appear in the text boxes for the Ratio Denominator parameters.

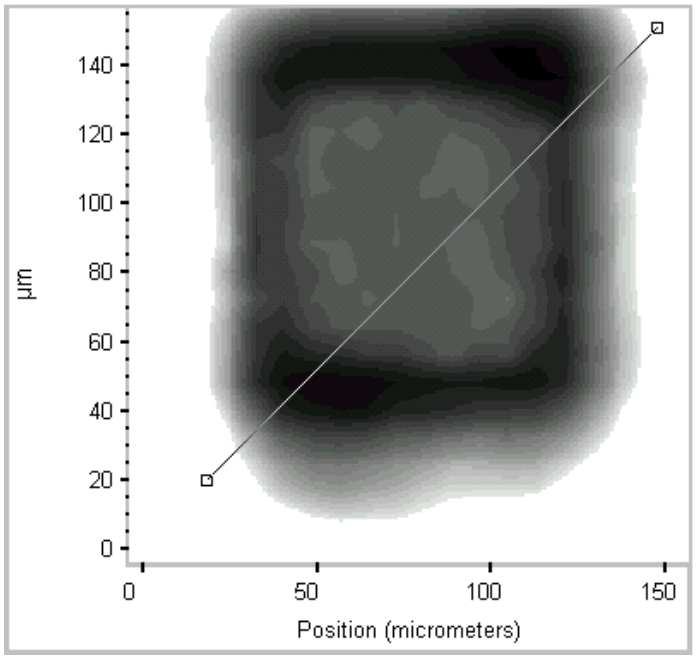
When you are finished making adjustments, you can use the Create button or Replace button to create the profile.

Specifying sample points for extracting a line map from an area map

The extraction tool lets you specify graphically the sample points to use when you create a line map from an area map. You simply draw the desired line across the area contour map or the video image. The sample points closest to the line drawn on the map or video image will be used to create the new line map.

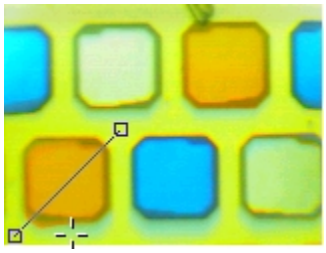
Start by positioning the pointer over the desired starting point for the line. Press the mouse button and drag the pointer to the desired ending point for the line. Then release the mouse button.

The line you drew appears in the contour map or video image, depending on where you drew the line. Here is an example showing a line drawn across an area contour map:



This is much like drawing a line across the sample that was used to collect the area map.

Here is an example of a line drawn across a video image:



The X and Y values of the line endpoints appear above the palette.

You can adjust the line by dragging either of its endpoints, the small squares at the ends of the line.

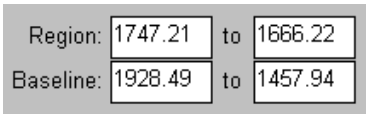
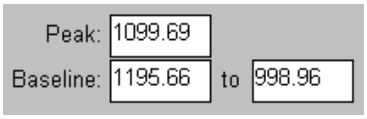
When you are satisfied with the line, use Extract Line Map in the Atlμs menu to create the line map. See “Extracting a line map from an area map” in the “Atlμs Menu Commands” chapter for complete information.

Note You can also extract the line map without using the Extract Line Map command. Just double-click an endpoint of the line you drew with the extraction tool. ▲

Creating a profile

profile A representation of map data in which a measurement of spectral intensity or some other characteristic is shown for each sample point.

You can use the Profile Setup button near the bottom of the map window to create a new profile from the current map. The term "profile" is used to refer to any of the ways of representing map data described in the table below. The table also describes the information you need to specify for each profile type. The numerical values shown are just examples.

Profile Type	*What the Profile Shows*	*Needed Information*
Chemigram	Integrated spectral intensity of a specified spectral region for each sample point.	The frequency limits of the spectral region and baseline endpoints: 
Peak Height Of One Peak	The corrected height of the specified peak for each sample point.	The frequency location of the peak and the baseline endpoints: 

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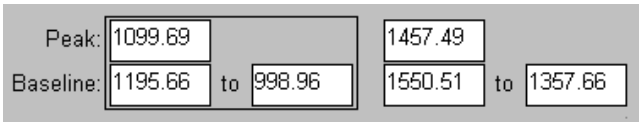
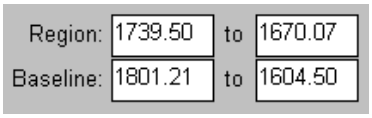
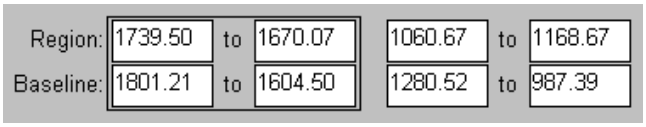
Profile Type	*What the Profile Shows*	*Needed Information*
Peak Height Ratio Of Two Peaks	Ratio of the corrected heights of two specified peaks for each sample point.	The frequency locations of the two peaks and their baseline endpoints:  The parameters for the peak whose height will be the numerator in the ratio are labeled “Ratio Numerator”; the parameters for the denominator peak are labeled “Ratio Denominator.”
Peak Area Of One Peak	The corrected area of the specified peak for each sample point.	The frequency limits of the peak and baseline endpoints: 
Peak Area Ratio Of Two Peaks	The ratio of the corrected areas of two specified peaks for each sample point.	The spectral regions of the two peaks and their baseline endpoints:  The parameters for the peak whose area will be the numerator in the ratio are labeled “Ratio Numerator”; the parameters for the denominator peak are labeled “Ratio Denominator.”

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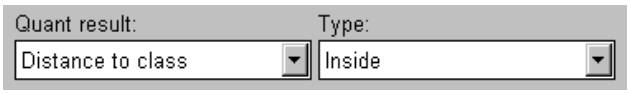
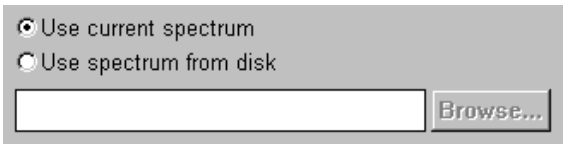
Profile Type	*What the Profile Shows*	*Needed Information*
Quant Result Of One Component	Results obtained from a quantitative analysis, such as search metrics, component concentration, uncertainty or standard error in component concentration, match value from a similarity match, class number or distance metric from a discriminant analysis, or peak heights or areas.	The quant result and type to profile:  The available results and types depend on the current quant method and the map. To specify a quant method, use Quant Setup in the Analyze menu to open a method file. See the OMNIC Help system for more information.

(continued on next page)

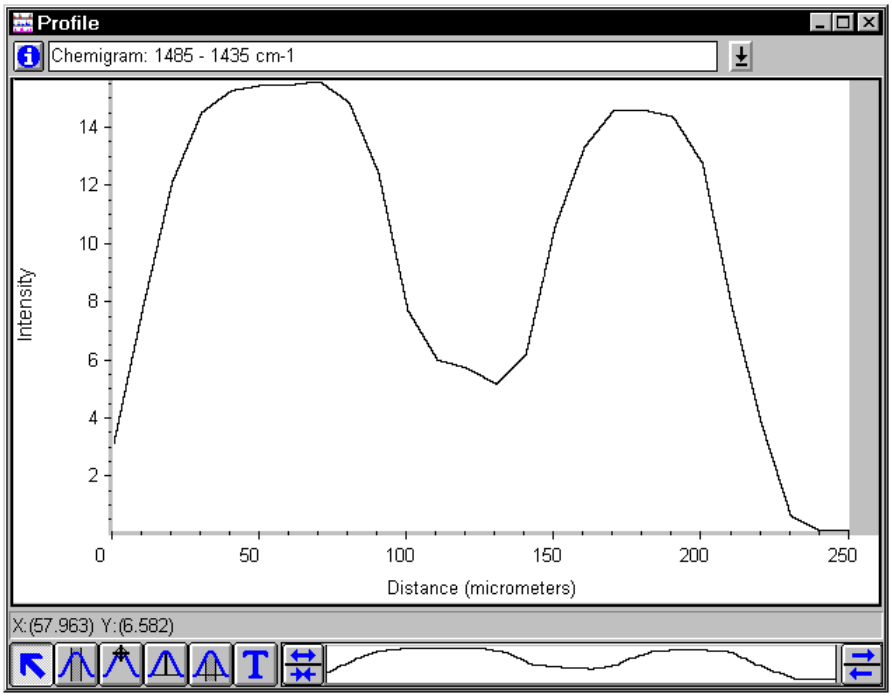
Profile Type	*What the Profile Shows*	*Needed Information*
Functional Group	Correlation between the integrated spectral intensities of the map spectra and the weighted intensities of the selected functional group within the spectral regions specified for the group. This lets you quickly find the locations on the sample where absorptions most characteristic of the functional group occurred. *Set Scale to Linear, turn off Auto Threshold, and set Background Threshold to 0 and Foreground Threshold to 1 in the Display Options dialog box before creating this profile type.* See "Setting the display options" in the "Atlμs Menu Commands" chapter for more information.	The identity of the functional group. To specify a predefined functional group (a set of more than fifty functional groups is provided with the software), select the Predefined Groups option and then select a group from the Functional Group drop-down list box and a type from the Type drop-down list box. The available types depend on the functional group you have selected.  To specify a functional group you have defined using Edit Functional Groups in the Atlμs menu, select the User-Defined option and then select a group from the Functional Group drop-down list box. (The Type drop-down list box is not available for user-defined groups.)  See "Viewing, editing or creating functional groups" in the "Atlμs Menu Commands" chapter for details on defining your own functional groups.

(continued on next page)

Profile Type	*What the Profile Shows*	*Needed Information*
Correlation Map	Correlation between the map spectra and the specified reference spectrum. This lets you find the locations of the reference compound (or similar compounds) on the sample. The resulting correlation intensity values of the map spectra are analogous to the match values of library spectra displayed after a spectral search. A higher intensity value indicates a greater similarity to the reference spectrum. A value of 1.0 indicates that the map spectrum and reference spectrum are identical. *Set Scale to Linear, turn off Auto Threshold, and set Background Threshold to 0 and Foreground Threshold to 1 in the Display Options dialog box before creating this profile type.* See "Setting the display options" in the "Atlµs Menu Commands" chapter for more information.	The spectrum to use as the reference:  If you select Use Current Spectrum, specify the current spectrum by clicking a location in the map with the spectral cursor tool. The spectrum is displayed in the spectral display pane of the map window. If you select Use Spectrum From Disk, type the pathname of the desired spectrum in the text box, or choose Browse and locate and select a spectrum in the dialog box that appears.

Note Profiles created using the Chemigram and Peak Area Of One Peak profile types are identical. ▲

In each case a profile created from a line map is displayed in a spectral window called the Profile window. The illustration below shows a Chemigram for a line map in the Profile window. The other profile types created from line maps have a similar appearance.



The X-axis of the window shows the distance of each point from the first sample point. The Y-axis shows values appropriate for the profile type. For example, if you selected the Chemigram option, the Y-axis shows the overall spectral intensity for the specified spectral region. If you create more than one profile, they are all displayed in the same window and can be compared visually just as you would compare spectra. When you select a profile in the Profile window, the Y-axis changes to the appropriate scale.

A profile created from an area map appears as an area contour map in a map window (all area contour maps are profiles).

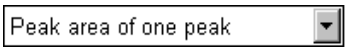
You have the choice of displaying the new profile in a new map window or replacing the current area contour map with the new one. As in all area contour maps, the profile you create uses rectangular areas of color to represent values of the specified type at each sample point. For example, if you selected the Peak Area Of One Peak Option, the colors indicate peak area values. See “Displaying area map data” for complete information on interpreting an area contour map.

Follow these steps to create a profile:

1. **Click the Profile Setup button in the map window that contains the map from which you want to create the profile.**

   The map window is maximized if it is not already, and a set of parameters appears allowing you to select a profile type and specify frequency and other information. The parameters that initially appear depend on the type of profile that you last created.

2. **Select the desired profile type from the drop-down list box at the left side of the window.**



   Depending on the profile type you select, text boxes, a drop-down list box or option buttons may appear allowing you to enter or select the needed information. See the table earlier in this section for a description of these items.

3. **Enter or select the appropriate information.**

   You can use the palette tools to specify some information graphically within the spectral display pane. You may need to adjust the display first using the view finder or other techniques in order to see the desired region. When you use a tool, the parameter values are updated automatically.

   - If you are creating a Chemigram, use the region tool or peak area tool to select a spectral region. See “Selecting a spectral region” or “Specifying peak areas and baselines” if you are not familiar with using the tools.

   - If you selected the Peak Height Of One Peak or Peak Height Ratio Of Two Peaks options, use the peak height tool to specify the peak or peaks and a baseline. See “Specifying peak locations and baselines” for complete information.

   - If you selected the Peak Area Of One Peak or Peak Area Ratio Of Two Peaks options, use the peak area tool to specify the peak or peaks and a baseline. (You can also use the region tool if you don’t need to manipulate the baseline endpoints graphically.) See “Specifying peak areas and baselines” for details on using the peak area tool. See “Selecting a spectral region” for information on using the region tool.

4. **Click the Create button or the Replace button to create the new profile.**

   - If you are creating a line map profile, click the Create button. The Replace button is not available for line maps.

- If you are creating an area map profile and want the new profile displayed in a new map window, click the Create button.

- If you are creating an area map profile and want to replace the current profile with the new one, click the Replace button.

The new profile is calculated and appears in the appropriate window.

To close the profile setup parameters without creating a profile, click the Close Setup button.

5 Atlµs Window Menus

This chapter explains how to use the commands in the menus provided in the Atlµs window. The table below shows the kinds of operations you can perform with the commands in each menu.

To do this...	*Use this menu...*
Open or save a map sequence or close the Atlµs window.	File
Clear or restore a map sequence or drawn aperture, or specify annotation colors, a default step size or how to display text annotation.	Edit
Set up or perform a mapping experiment.	Collect
Specify the view of the stage area in the navigation pane and whether to display annotation in the navigation and video panes.	View
Specify the video source, copy or save the video image, capture a Mosaic of video images, calibrate the video image, or adjust the video image size.	Image
Move the stage to the origin, to a specified point or by specified steps; select serial ports for communication; or set the autofocus options.	Stage
Arrange the Atlµs and OMNIC windows.	Window
Find Help information about Atlµs features or display the software version number and copyright information and the current video rate.	Help

The next sections explain in detail how to use the commands in each menu.

File menu commands

Use the commands in the File menu of the Atlμs window to perform the operations described in the following table.

To do this...	*Use this command...*
Open a map sequence.	Open
Save a map sequence.	Save
Save a map sequence using a new filename.	Save As
Print the video image.	Print
Set up the printer for printing.	Printer Setup
Close the Atlμs window.	Exit

The next sections explain in detail how to use each command.

Opening a map sequence

Use Open in the File menu of the Atlμs window to open a map sequence file stored on a disk. When you open the file, the map it defines is displayed in the navigation pane. The map may also appear in the video pane depending on the stage coordinates currently represented by the pane. If there is already a current sequence definition (a current map) displayed in the Atlμs window, it is replaced by the sequence file you opened.

➡ *How to* ➡ Open a sequence

1. **Choose Open from the File menu of the Atlµs window.**

   The Open dialog box appears listing the available sequence files, which have the extension .SEQ. The default directory is the directory of the last sequence file that was opened.

2. **Type the name of the file you want to open, or locate and select a file.**

   You can change directories or drives to locate the file you want to open.

3. **Choose OK.**

   The map defined by the sequence file appears in the Atlµs window, replacing any map that is currently displayed in the window.

Saving a map sequence

Save

Use Save in the File menu of the Atlµs window to save the current map sequence using its current filename and directory location. If you want to save the sequence using a different filename or directory location, use the Save As command. See "Saving a map sequence using a different filename" for details.

➡ *How to* ➡ Save the current sequence

1. **Choose Save from the File menu of the Atlµs window.**

   If the sequence you are saving already has a filename, the sequence is saved using the same name and the operation is finished.

   If the sequence does not have a filename, the Save Sequence As dialog box appears.

2. **If the Save Sequence As dialog box appears, type a filename in the File Name text box and select the directory where you want the sequence saved.**

   Use the extension .SEQ for the filename.

3. **Choose OK.**

Saving a map sequence using a new filename

Save As...

Use Save As in the File menu of the Atlμs window if you want to save a previously saved current map sequence and specify a filename or directory location for the sequence file.

➡ *How to* ➡

Save a sequence using a new filename or directory location

1. **Choose Save As from the File menu of the Atlμs window.**

   The Save Sequence As dialog box appears. The default directory is the directory of the last sequence file that was saved.

2. **Type a filename in the File Name text box.**

   Use the extension .SEQ for the filename.

3. **Select the directory where you want the sequence saved.**

4. **Choose OK.**

Printing the video image

Print...

Use Print in the File menu of the Atlμs window to print the video image displayed in the video pane. If Video Annotation is turned on in the View menu of the Atlμs window, the axes and annotation are printed as well.

Note To print a Mosaic of video images displayed in the navigation pane, use Print Mosaic in the Image menu. See "Printing a Mosaic" for details. ▲

➡ *How to* ➡ Print the video image

1. **Choose Print from the File menu of the Atlµs window.**

   The Print dialog box appears.

2. **Set the print parameters as desired.**

3. **Choose OK.**

Setting up the printer

Printer Setup...

Use Printer Setup in the File menu of the Atlµs window to set the printer parameters for printing the video image in the video pane with Print in the File menu or a Mosaic in the navigation pane with Print Mosaic in the Image menu.

➡ *How to* ➡ Set up the printer

1. **Choose Printer Setup from the File menu of the Atlµs window.**

   The Print Setup dialog box appears.

2. **Set the parameters as desired.**

3. **Choose OK.**

Exiting Atlµs

Exit

Use the Exit command in the File menu of the Atlµs window to exit Atlµs. When you exit Atlµs, the Atlµs window and any current map sequence are closed.

➡ *How to* ➡ Exit Atlμs

Choose Exit from the File menu of the Atlμs window.

Note You can also exit Atlμs by clicking the window's Close button. ▲

Edit menu commands

Use the commands in the Edit menu of the Atlμs window to perform the operations described in the following table.

To do this...	*Use this command...*
Restore a cleared map sequence.	Undo Clear
Clear a map sequence.	Clear
Specify colors for displaying annotation, a default step size and how to display text annotation.	Options

The next sections explain in detail how to use each command.

Restoring a cleared map sequence

Undo Clear

If you have used Clear in the Edit menu of the Atlμs window to remove a map sequence from the window (and the Map Setup dialog box) and have not yet defined a new sequence, you can use Undo Clear to restore the sequence. When you use Undo Clear, the map sequence annotation is restored in the navigation pane. The map annotation may also appear again in the video pane, depending on the stage coordinates currently represented by the pane. The settings in the Map Setup dialog box are also restored when you use Undo Clear. See "Clearing a map sequence" for details on using Clear.

How to Restore a cleared map sequence

Choose Undo Clear from the Edit menu of the Atlμs window.

The items that were cleared are restored in the window and in the Map Setup dialog box. These items can include a map with its background point, if defined, and a drawn aperture.

Clearing a map sequence

Clear

Use Clear in the Edit menu of the Atlμs window to remove a map sequence from the window (and the Map Setup dialog box). The command removes the map with its background point, if defined, from the navigation pane and video pane (if present) and any drawn aperture displayed in the video pane. All map sequence settings and annotation are also cleared from the Map Setup dialog box (see "Setting up data collection" for information on this dialog box).

Note If you have a Continuμm microscope with the optional automated Reflex aperture system, the box representing the Reflex aperture is not cleared. ▲

How to Clear a map sequence

Choose Clear from the Edit menu of the Atlμs window.

Any map, including any defined background point, and drawn aperture displayed in the window and specified in the Map Setup dialog box are cleared.

Tips Clearing a map sequence

- If you have not yet defined a new map sequence, you can undo the clear operation with the Undo Clear command. See "Restoring a cleared map sequence" for details.
- Clear is available in the Edit menu only if a map sequence has been defined.

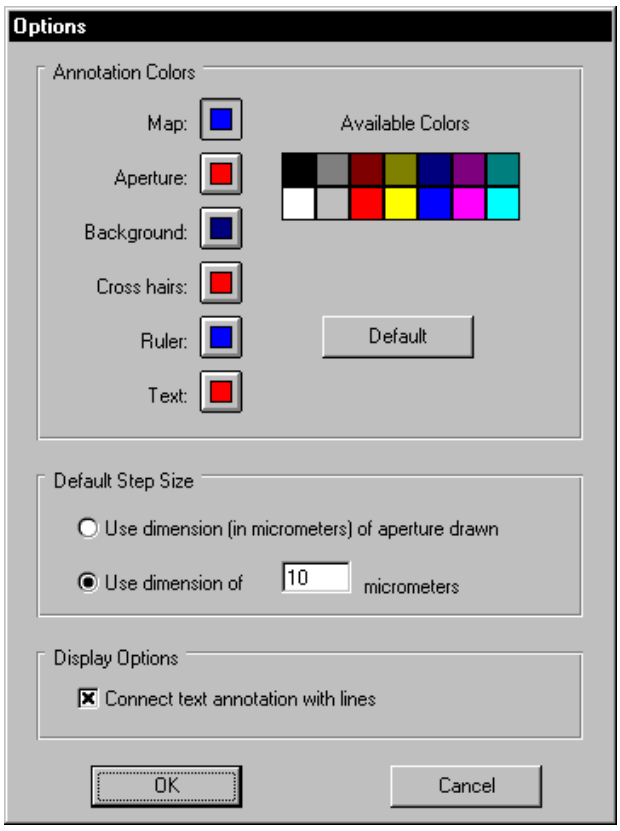
- If you have collected a background spectrum using a material other than your sample, clear the background point and then move the sample into position and define the map. As long as you do not define a new background point for the map, the last background collected will be used to ratio the map spectra.

Specifying annotation colors, a default step size and how to display text annotation

Options...

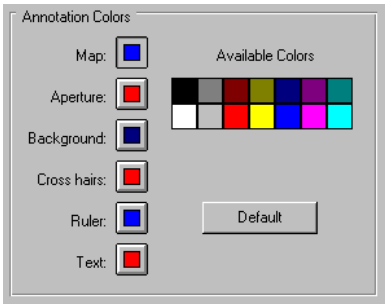
Use Options in the Edit menu of the Atlµs window to specify the colors used to display annotation in the window, a default step size for new map sequences, and whether to connect text annotation to the annotated item with a line.

The color, step size and text annotation options are contained in the Options dialog box:



The color options you select take effect when you choose OK to close the Options dialog box and are retained when you exit and restart OMNIC Atlµs or open the Atlµs window with Show Atlµs Window in the Atlµs menu.

Specifying annotation colors



The buttons in the Annotation Colors box let you specify colors for displaying different types of annotation in the Atlµs window. Changing the color of annotation can make it easier to see annotation displayed against a similarly colored sample.

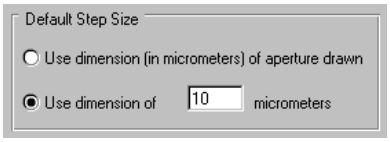
When the Options dialog box first appears, the buttons show the currently selected annotation colors. To specify a different color, click a button for an annotation type and then click the color in the array of VGA colors that you want used to display that annotation type. The color you clicked appears on the button.

The following table describes the effects of each button.

Button	*Affected Annotation*
Map	Line maps, area maps and discrete sample points (including those in an ordered array) in the navigation and video panes.
Aperture	The box representing the optional automated Reflex aperture and circular and rectangular drawn apertures in the video pane. Circular and rectangular drawn apertures in the video pane.
Background	Background points in the navigation and video panes.
Cross Hairs	Cross hairs in the navigation and video panes.
Ruler	Rulers in the video pane.
Text	Text annotation in the video pane.

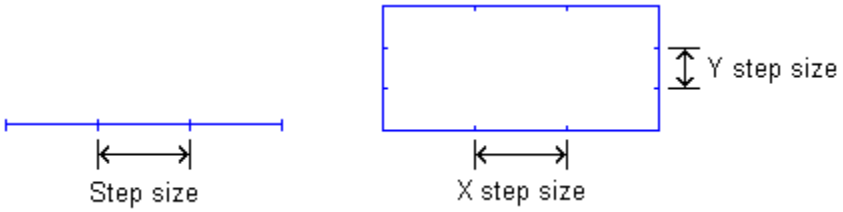
You can click the Default button to return all the selected colors to the default colors.

Specifying a default step size



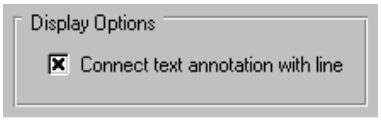
step In a line map, the gap between consecutive sample points; in an area map, the gap between a row or column of sample points.

The options in the Default Step Size box let you specify the default step size for maps you define using Map Setup or the palette tools. (See the examples illustrated below for definitions of step sizes of line maps and area maps.) Select Use Dimension (In Micrometers) Of Aperture Drawn to specify a default step size that matches the size of the current drawn aperture (if you have created one). For a circular drawn aperture, the dimension used is the diameter; for a rectangular drawn aperture, the dimension used is the length of the shorter side. Select Use Dimension Of __ Micrometers if you want to enter a value in micrometers in the text box.



Line map ***Area map***

Connecting text annotation with a line



If you want text annotation you create in the video pane with the text tool to be connected to the annotated item with a line, turn on Connect Text Annotation With Line in the Display Options box.

How to

Set the options

1. **Choose Options from the Edit menu of the Atlμs window.**

   The Options dialog box appears.

2. **Select the desired annotation colors in the Annotation Colors box.**

   To select a color for an annotation type, click the button for the annotation type and then click the desired color in the array of VGA colors.

   To select the default colors for all the annotation types, click the Default button.

3. **Select the desired default step size option in the Default Step Size box.**

   - If you select Use Dimension (In Micrometers) Of Aperture Drawn, the default map step size will match the size of the current drawn aperture (if present): the diameter for a circular drawn aperture or the length of the shorter side for a rectangular drawn aperture.

   - If you select Use Dimension Of __ Micrometers, type the desired default map step size in the text box.

4. **If you want text annotation you create with the text tool to be connected to the annotated item with a line, turn on Connect Text Annotation With Line in the Display Options box.**

5. **Choose OK to close the Options dialog box.**

   Any annotation that is displayed or that you create is displayed in the selected colors.

   To close the dialog box without using the changes you made, choose Cancel.

Collect menu commands

Use the commands in the Collect menu of the Atlµs window to set up or perform a mapping experiment. The following table shows what you can do with each command.

To do this...	*Use this command...*
Set parameters that control map data collection.	Map Setup
Set the optical bench parameters.	Bench Setup
Set the profile options.	Profile Options
Set the display options.	Display Options
Collect a background spectrum at the current stage location.	Collect Background At Current Location
Collect a sample spectrum at the current stage location.	Collect Sample At Current Location
Collect a background spectrum for a map.	Collect Map Background
Collect a map or data at discrete sample points.	Collect Map

The next sections explain in detail how to use each command. For more general information on creating and working with maps, see the “Overview” chapter.

Setting up data collection

Use Map Setup in the Collect menu of the Atlµs window to set parameters that determine how a map is collected. When you choose the command, the Map Setup dialog box appears displaying any one of up to five sets of parameters. To display the desired set of parameters, click the appropriate tab near the top of the dialog box.

The following table describes what you can do with the features on each tab. These features are illustrated and explained in detail the next sections.

To do this...	*Use this tab...*
Specify the type of map to collect and how to collect it.	Dimensions
Specify the aperture for data collection.	Aperture
Enter specifications that affect map data collection.	Collect
Specify how to handle saving video images, storing map coordinates, pausing between spectra and collecting backgrounds.	Options
Specify whether and how to focus the microscope automatically during map collection.	Focus*

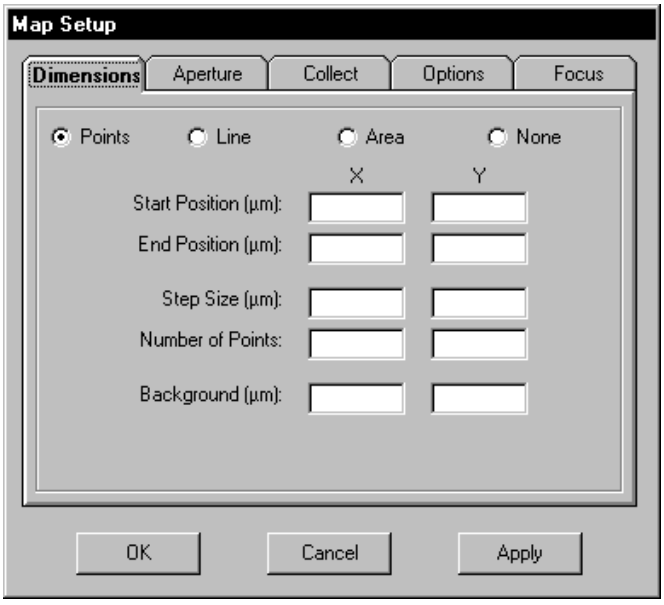
* The Focus tab is available only if your microscope has the required optional hardware.

The Map Setup dialog box is interactive. After you make one or more changes to the Dimensions or Aperture parameter settings, you can immediately click the Apply button to see the effects of your changes without closing the dialog box.

Your parameter settings become the current map sequence. To save your settings in a sequence file that you can open later, use Save in the File menu of the Atlμs window. See “Saving a map sequence” for more information.

Dimensions parameters

The Dimensions parameters let you specify the type of map to collect and how to collect it. If you have specified a map using the Atlμs window palette tools, the map specifications already appear on the Dimensions tab. You can make changes to any of the parameters values in the dialog box. You can also specify an optional background point if the point is on the same sample as the map.



If you use the Dimensions tab to specify a map or a background point, the map or point appears in the navigation pane (and video pane if you are displaying video annotation and the map is within the video field of view) when you choose Apply or OK. Any map that you specified earlier using one of the tools is either modified according to the new specifications or deleted as appropriate.

step size In a line map: the distance between consecutive sample points. In an area map: the X step size is the distance between the columns of sample points in the map; the Y step size is the distance between the rows of sample points.

When specifying the step size, it is important to keep the aperture size in mind. You may wish to set the step size equal to the aperture size to ensure that spectra are obtained over the entire mapping region. You may also want to "over-step" your map to obtain a smoother profile. To do this, use a step size that is smaller than the aperture size.

If you have selected Line or Area, estimates of the total collection time and the amount of disk space that will be needed to store the spectra appear at the bottom of the dialog box when you choose Apply. If you do not have enough disk space for the map as currently specified, a warning appears in red just above the estimates. If you change the parameter settings, the estimates are updated when you choose Apply.

You should generally try to minimize the time needed to collect a map. Decreasing the number of scans, decreasing the spectral resolution (for example, changing from 4 wavenumbers to 8 wavenumbers) and increasing the step size can all reduce the total collection time. (The Resolution parameter is on the Collect tab.) Conversely, the number of scans and the aperture size should be large enough to give high signal-to-noise values, and the step size should not be so large as to sacrifice spatial resolution. Use the combination of settings that provides the best compromise for your experiment.

The available Dimensions parameters vary depending on which map type you select: Points, Line, Area or None.

Points – When you specify discrete sample points instead of a line map or area map, there is no need to specify some of the characteristics that those map types have: a start position and end position, a step size and the number of points. Instead, the sample spectra are collected in the order in which the sample points were defined (with the sample point tool), with the background always collected first.

Note If you specify an ordered array of discrete points, you enter the step size and number of points just before the array is drawn. ▲

The only parameter available for the Points option is Background (µm). This parameter lets you enter the X and Y values for the desired background point location. If you have already specified a background point using one of the Atlµs window palette tools, the specified X and Y values appear in the Background (µm) text boxes. You can change the values if desired.

See “Using the tool palette” in the “The Atlμs Window” chapter for information on using the tools to specify sample and background points.

Line – If you select Line, the parameters described in the following table become available. All X and Y position values are measured in micrometers from the origin (0,0) point.

Parameter	*Description*
Start Position (μm)	The X and Y position values of the point of the line map at which map sample data collection will begin. This point appears on the left when you draw a line map in the navigation pane or video pane. If you change the start position by typing a new X or Y value and then choose Apply or OK, the number of points changes to reflect the new line length.
End Position (μm)	The X and Y values of the last sample point of the line map to be collected. The X value of the end position should be greater than that of the start position (that is, to the right of the start position in the navigation or video pane). If this is not the case, the start and end values will be switched when you choose Apply or OK. If you change the start position by typing a new X or Y value and then choose Apply or OK, the number of points changes to reflect the new line length and the end position value changes as needed to allow even spacing of the points.

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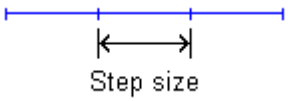
Parameter	*Description*
Step Size (µm)	The distance in micrometers between consecutive sample points in the line map. Here is an example:  If the distance between the start and end points is not evenly divisible by the specified step size, the end position value is adjusted automatically to accommodate the step size. If you change the step size by typing a new value and then choose Apply or OK, the number of points changes to reflect the new step size and the end position value changes as needed to allow even spacing of the points. The default step size is determined by which Default Step Size option is selected in the Options dialog box. See “Specifying a default step size” in the “Atlµs Window Menus” chapter for more information.
Number Of Points	The number of sample points in the line map. If you change the number of points by typing a new value and then choose Apply or OK, the X and Y values of the end position change to reflect the new number of points.
Background (µm)	The X and Y position values of the background point. You can specify the background point here or by using a tool. See “Using the tool palette” in the “The Atlµs Window” chapter for more information.

See “Drawing a line map and specifying a background point” in the “The Atlµs Window” chapter for information on using the line map tool to draw a line map.

Area – If you select Area, the parameters described in the following table become available. All X and Y position values are measured in micrometers from the origin (0,0) point in the microscope field of view. Because area maps have steps in both the X and Y directions, the step size and number of points have both an X and Y entry. In the table, an "X point" is an X value in the map at which data will be collected. Similarly, a "Y point" is a Y value in the map at which data will be collected.

Parameter	*Description*
Start Position (µm)	The X and Y position values of the corner of the area map at which map sample data collection will begin. This point appears as the lower-left corner when you draw an area map in the navigation pane or video pane. If you change the start position by typing a new X or Y value and then choose Apply or OK, the number of X or Y points changes as appropriate to reflect the step size in that dimension.
End Position (µm)	The X and Y values of the last sample point of the area map to be collected. The X and Y values of the end position should both be greater than those of the start position; that is, the end position should be the upper-right corner of the map in the navigation or video pane. If this is not the case, the start and end X values or Y values will be switched as appropriate when you choose Apply or OK. If you change the start position by typing a new X or Y value and then choose Apply or OK, the number of X or Y points changes as appropriate to reflect the step size in that dimension and the end position value changes as needed to allow even spacing of the points.

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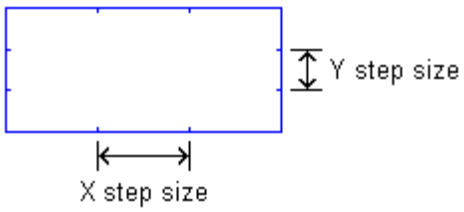
Parameter	*Description*
Step Size (µm)	The X step size is the distance in micrometers between the columns of sample points in the map. The Y step size is the distance in micrometers between the rows of sample points. Here is an example:  If the X or Y dimension of the map is not evenly divisible by the specified step size in that dimension, the X or Y value of the end position is adjusted automatically to accommodate the step size. If you change the X or Y step size, the number of X or Y points changes as appropriate to reflect the step size in that dimension and the end position value changes as needed to allow even spacing of the points.
Number Of Points	The number of X or Y points. If you change the number of X or Y points, the end position value changes as appropriate to reflect the new number of points in that dimension.
Background (µm)	The X and Y position values of the background point. You can specify the background point here or by using a tool. See “Using the tool palette” in the “The Atlµs Window” chapter for more information.

See “Drawing an area map (or Mosaic) and specifying a background point” in the “The Atlµs Window” chapter for information on using the area map tool to draw an area map.

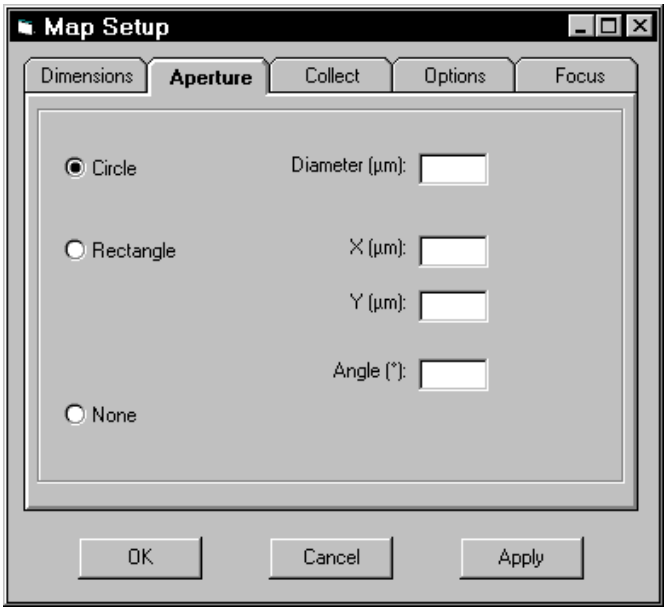
None – If you select the None option, the only available parameter is Background (µm).

Aperture parameters

The Aperture parameters let you specify the aperture that you will be using for data collection. (If you have a microscope other than a Continuµm with the optional automated Reflex aperture system, this serves only to make a record of the aperture used. It does not set the physical aperture.)

If you have specified an aperture using the Atlµs window palette tools, the aperture specifications already appear on the Aperture tab. You can make changes to any of the parameter values in the dialog box.

The options that appear on the Aperture tab depend on the microscope you have and the features it includes. Here is an example:



When you select an option, the parameters for that option become available. The following table describes all the parameters.

Note If you have a Continuμm microscope with the optional automated Reflex aperture system, the tab does not contain the Circle, Rectangle and None options. Instead, three parameters are available: X (μm), Y (μm) and Angle (degrees). See their descriptions in the "Rectangle" row of the table. The Reflex aperture is represented in the video pane by a box whose size, shape and orientation you can manipulate. See "Adjusting the automated Reflex aperture on a Continuμm microscope" in the "The Atlμs Window" chapter for details. You can set the aperture numerically on this tab or by using Aperture Dimensions in the Continuμm menu. See "Setting the automated Reflex aperture numerically" in the "Atlμs Window Menus" chapter for details. ▲

Option	*Description*
Circle	If you select Circle, the Diam. (μm) parameter becomes available allowing you to specify the diameter of the aperture in micrometers. See "Drawing a circular aperture" in the "The Atlμs Window" chapter for information on using the circular aperture tool to draw a circular aperture. If the circular aperture is available, you can use it to draw a circular aperture. If you have a Continuμm microscope, the Circle option is not available since the microscope has a rectangular aperture.

Continued on next page

Option	*Description*
Rectangle	If you select Rectangle, the following parameters become available: X (µm) - The X dimension of the drawn aperture in micrometers, before any rotation. Y (µm) - The Y dimension of the drawn aperture in micrometers, before any rotation. Angle (°) - The angle by which the aperture is rotated about the map center point within the plane of the sample. An angle of 0 positions the aperture with its X dimension parallel to the X-axis. You can rotate the aperture from 45 to -45 degrees (a negative angle rotates the aperture clockwise). With this range of rotation plus the ability to resize a drawn aperture with the arrow tool, any combination of orientation and rectangular shape is possible. You can also rotate a drawn rectangular aperture using the arrow tool.
None	Select None if you will not be using an aperture.

To see the effects of your parameter settings on the video image without closing the dialog box, choose Apply.

Note Adjust the aperture installed in the microscope to match the size, shape and orientation of the specified aperture before collecting data. (If you have a Continuµm microscope with the optional automated Reflex aperture system, this is done automatically.) ▲

See “Drawing a rectangular aperture” in the “The Atlµs Window” chapter for information on using the rectangular aperture tool to draw a rectangular aperture.

Collect parameters

The Collect parameters let you enter specifications that are pertinent to collecting map data. The following illustration shows the Collect parameters.

Note Parameter settings you make here replace the settings of the same parameters in the Experiment Setup dialog box of OMNIC. ▲

The table below shows what you can specify with each parameter.

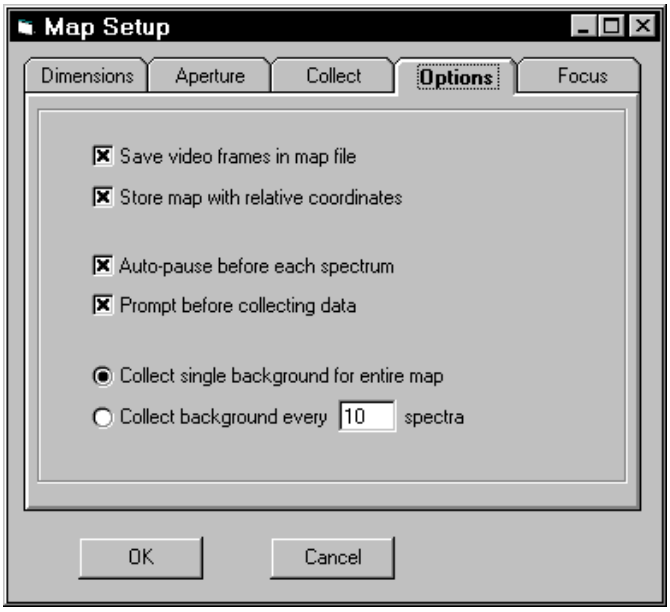
Parameter	*Description*
Map Title	The title of the map to be collected. The title can have up to 256 characters.
Number Of Scans	The number of scans to be collected for each sample and background spectrum. Increasing the number of scans can reduce the noise level of the data, but the experiment will take longer to complete.
Resolution	The wavenumber resolution of the collected spectra. Selecting a smaller value gives a greater resolution. When choosing a resolution for an experiment, keep in mind that spectra collected at higher resolution require more disk space and more time to collect than those at lower resolution.
Apodization	The type of apodization to use for the collection. See the OMNIC Help system for an explanation of the available apodization types.
Final Format	The final format of the collected spectra. This determines the X and Y units of the data. The available formats, described in the next table, depend on the setting of Sample Compartment in the Experiment Setup dialog box. See “Setting the optical bench parameters” in the “Atlμs Window Menus” chapter for more information.

Sample Compartment Setting	*Final Formats*	*X Unit*	*Y Unit*
Right µScope; %T or Left µScope; %T	Interferogram	data point	volt
	SingleBeam	wavenumber	arbitrary
	%Transmittance	wavenumber	% transmittance
	Absorbance	wavenumber	absorbance
Right µScope; %R or Left µScope; %R	Interferogram	data point	volt
	SingleBeam	wavenumber	arbitrary
	Kubelka-Munk	wavenumber	Kubelka-Munk
	%Reflectance	wavenumber	% reflectance
	Log(1/R)	wavenumber	log (1/R)
Microscope, Main or Raman	Interferogram	data point	volt
	Raman Spectrum	wavenumber	Raman intensity
	Shifted Spectrum	Raman shift wavenumber	Raman intensity
	Corrected Spectrum	Raman shift wavenumber	Raman intensity

Note Changing the number of scans alters the time estimate for the map data collection, and changing the resolution alters the time estimate and the storage size of the map. Therefore, after you set the Collect parameters, it is a good idea to return to the Dimensions tab and choose Apply to see if the time and disk space estimates shown at the bottom of the dialog box are still acceptable. ▲

Options

The options shown in the following illustration appear when you click the Options tab.



The following table shows what you can specify with each option.

Option	*Description*
Save Video Frames In Map File	Turn this option on if you want the video frames of the mapped area saved in the map experiment file. The number of frames saved depends on the size of the area. Since mapping experiment files are much larger when they include stored video information, you should save the video frames only if you have adequate disk space. The default setting of this option is on.

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Option	*Description*
Store Map With Relative Coordinates	Turn this option on if you want relative coordinates used instead of actual stage positions as grid references for the spectral data when the contour map is displayed. When relative coordinates are used, the first point collected (the start point) becomes 0,0. The default setting of this option is on.
Auto-Pause Before Each Spectrum	Turn this option on if you want the system to pause after each sample spectrum is collected and again after the stage is moved to the next sample point. This is useful when you are collecting ATR data and need to release contact after a spectrum is collected and reestablish contact before the next spectrum is collected. Pausing is also useful when the sample is uneven, requiring you to refocus at some of the sample points. The default setting of this option is off.
Prompt Before Collecting Data	Turn this option on if you want the software to display a prompt immediately before collecting the first map spectrum. This option is useful if you want to save the video frames without an aperture in place but need to use an aperture during data collection. Also, if your microscope does not have automated mirrors controlled by the software and you want to save the video frames, you must turn this option on so that you can flip the mirrors manually before the first spectrum is collected. The default setting of this option is on. Follow these steps to use this option: 1. Set up the map experiment with the aperture in place. Turn on Save Video Frames In Map File. 2. Remove the aperture. 3. Initiate map data collection with Collect Map. 4. When the prompt appears, install the aperture (and manually flip the microscope mirrors if they are not automated) and then choose OK.

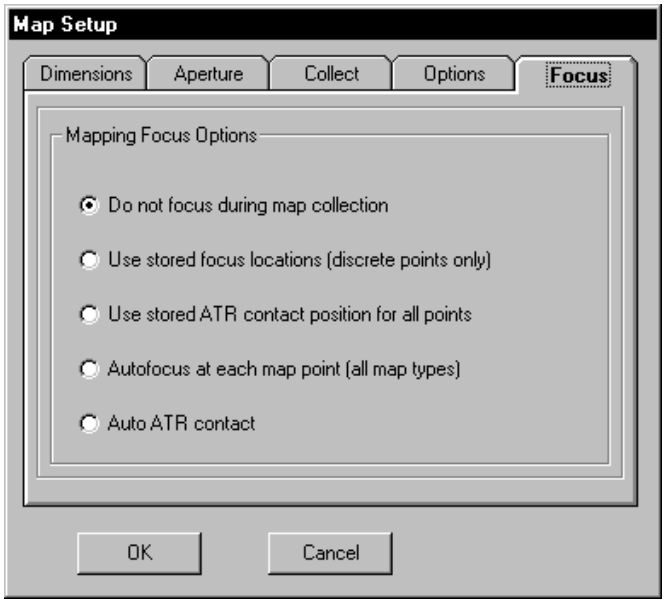
(continued on next page)

Option	*Description*
Collect Single Background For Entire Map	Select this option if you want to collect a single background spectrum before collecting the map sample spectra. The background will be used for ratioing every sample spectrum in the map. The default setting of this option is on.
Collect Background Every __ Spectra	If you plan to collect a large map and are concerned about atmospheric changes, you may want to use this option instead of the Collect Single Background For Entire Map option. If you select this option, you must specify the number of spectra to collect before another background is collected. Each background is collected at the same background point. Therefore, in order for you to use this option, there must be an area on the sample that can be used as the background reference. Spectra collected at the sample points will be ratioed against the last background collected. For example, if the number of spectra is five, an initial background spectrum is collected and then the first five sample spectra. The stage returns to the background point location and collects a new background. Then five more sample spectra are collected and ratioed against the second background. This process continues until the experiment is finished. The default setting of this option is off. The default number of spectra for the option is 10.

For more information on background handling, see “Collecting backgrounds” in the “Overview” chapter.

Focus parameters

The Focus parameters let you specify whether and how to focus the microscope automatically during data collection.



Note This tab is available only if your microscope has the required optional hardware. Only the options that are appropriate for your hardware configuration are available on the tab. ▲

The following table shows the effect of each available option.

Selecting this option...	*Has this effect...*
Do Not Focus During Map Collection	The microscope is not focused during map collection.
Use Stored Focus Locations (Discrete Points Only)	The microscope is focused at the discrete point locations you specified (including those in an ordered array). Select this option only if you are collecting data at discrete points rather than a line map or area map.
Use Stored ATR Contact Position For All Points	After each spectrum is collected, the system automatically lowers the stage, moves to the next sample point and then raises the stage to the stored Z position to collect the next spectrum. See "Collecting ATR data with autofocus" for more information on collecting ATR data with this option.
Autofocus At Each Map Point (All Map Types)	The microscope is focused at each location where data are collected. You can use this option for any type of data collection.
Auto ATR Contact	The microscope automatically makes and releases contact with the sample at each sample point.
Note	Contact is not made automatically for the background collection. ▲
	See "Using auto ATR contact" for more information.

Collecting ATR data with autofocus

If you have the optional autofocus feature, you can use ATR mode to break and restore contact with the sample automatically during an experiment.

Important Always lower the stage to break contact with the ATR crystal before moving the stage in the X or Y directions. Use the down arrow button (in the focus button group) to lower the stage. ▲

To use ATR mode with a ZnSe or diamond crystal:

1. Specify the X and Y coordinates of the sample points just as you would for any mapping or discrete-point experiment.

2. With the microscope in View mode and ATR objective in position, carefully raise the stage with the up arrow button (in the autofocus button group) to make contact with the sample. There will be a wetting effect or slight darkening of the field. See the documentation that came with your ATR crystal for more information.

3. Click the Store button in the Atlμs window to save the Z coordinate of the stage position. This coordinate will be used to make contact at every sample point in the experiment.

4. On the Focus tab of the Map Setup dialog box, select Use Stored ATR Contact Position For All Points and then choose OK.

   You can quickly check to make sure you have set the contact properly by clicking the down arrow button (in the focus button group) to lower the stage and then clicking the Recall button to raise the stage to the contact point. You should be able to see the sample absorption bands in the single-beam spectrum displayed in the Experiment Setup dialog box (choose Bench Setup from the Collect menu of the Atlμs window).

5. Start data collection.

To use ATR mode with any type of crystal:

1. Specify the X and Y coordinates of the sample points just as you would for any mapping or discrete-point experiment.

2. With the microscope in infrared mode, the ATR objective in position, and the single-beam spectrum displayed in the Experiment Setup dialog box (displayed by Bench Setup in the Collect menu of the Atlμs window), carefully raise the stage using the autofocus hardware controller to make contact with the sample. You should be able to see the sample absorption bands in the single-beam spectrum.

3. Click the Store button in the Atlμs window to save the Z coordinate of the stage position. This coordinate will be used to make contact at every sample point in the experiment.

4. On the Focus tab of the Map Setup dialog box, select Use Stored ATR Contact Position For All Points and then choose OK.

   You can quickly check to make sure you have set the contact properly by clicking the down arrow button (in the focus button group) to lower the stage and then clicking the Recall button to raise the stage to the contact point. You should be able to see the sample absorption bands in the single-beam spectrum in the Experiment Setup dialog box.

5. Start data collection.

Using auto ATR contact

If you have a Continuμm microscope with the optional auto ATR contact feature, you can collect ATR spectra with the optimal contact pressure automatically applied by the system.

- To collect an individual spectrum at the current stage location, use the Contact button to establish optimal contact with the sample and the Release button to release contact. The Contact button uses the microscope's internal Contact Alert System to determine the optimal contact. See the procedure later in this section for details.

- To collect a map, select Auto ATR Contact on the Focus tab of the Map Setup dialog box before starting the collection. With this option selected, the system automatically makes and releases contact with the sample at each sample point (the Contact and Release buttons are not used), but not at the background point. Because this feature uses the internal Contact Alert System instead of a single stored Z value to make sample contact, you can automatically collect a map of a sample of varying thickness without damaging the crystal or objective. See the procedure later in this section for details.

Note When OMNIC Atlμs starts, it checks to see if the Z-axis of the microscope has been initialized. If the axis has not been initialized, you are asked whether to initialize it.

- If you cancel the initialization, the autofocus and auto ATR contact features are disabled until the next time you start OMNIC Atlμs.

- If you initialize the Z-axis, the stage moves to its upper and lower limits and then back to the origin. After initialization, the stage returns to its former position. ▲

Important Lower the condenser all the way and remove the nosepiece from the microscope before initialization. ▲

To collect an ATR spectrum automatically:

1. Set up the internal Contact Alert System as explained in "ATR microscopy" in the "Advanced Techniques" chapter of the *Continuμm User's Guide*.

2. Install the sample and position the area of interest under the ATR objective or slide-on ATR attachment.

3. Click the Contact button. The stage automatically moves upward to make optimal contact with the sample. While the stage is moving upward, the button is labeled "Abort." If for any reason you need to stop the stage, click the button. After contact is made, the Contact button becomes the Release button.

Important You can use the up and down arrow buttons in the Atlμs window to adjust the contact pressure. However, be careful when clicking the up arrow button, since applying too much pressure can damage the ATR objective or crystal! Choose Experiment Setup from the Collect menu of the OMNIC window, and watch the live single-beam spectrum on the Bench tab for the appearance of sample absorptions to determine when optimal pressure has been achieved. ▲

Note If you use the up and down arrow buttons to change the contact pressure, the Contact button or Release button will become available depending on the current pressure. If you use the up arrow button, the computer will beep and the software will warn you about the risk of damage to the objective, sample or crystal.

4. Choose Collect Sample At Current Location from the Collect menu of the Atlμs window.

5. When data collection is finished, click the Release button. The stage moves downward to release contact with the sample.

To collect an ATR map automatically:

1. Set up the internal Contact Alert System as explained in "ATR microscopy" in the "Advanced Techniques" chapter of the *Continuμm User's Guide*.

2. Install the sample and position the area of interest under the ATR objective or slide-on ATR attachment.

3. Specify the map sequence using the Atlμs window tool palette and Map Setup in the Collect menu. Be sure to select **Auto ATR Contact** on the Focus tab of the Map Setup dialog box.

4. Choose Collect Map from the Collect menu of the Atlμs window. The system automatically makes and releases contact with the sample at each sample point while collecting the map.

➡ *How to* ➡ Set up data collection using Map Setup

1. **Choose Map Setup from the Collect menu of the Atlμs window.**

   The Map Setup dialog box appears.

2. **Display the set of parameters you want to change by clicking the appropriate tab at the top of the dialog box.**

3. **Set the parameters as desired.**

   See the descriptions of the parameters found earlier in this section for more information on the available settings.

   To see the effects of your changes without closing the dialog box, choose Apply.

4. **Repeat steps 2 and 3 for the other parameters you want to change.**

5. **When you are finished setting the parameters, choose OK.**

   To close the dialog box without using your changes, choose Cancel.

Note Any changes that you put into effect earlier by choosing Apply remain in effect if you choose Cancel. ▲

If you used the Dimensions tab to specify a map or a background point, the map or point appears in the navigation pane (and video pane if you are displaying video annotation) when you choose OK to close the Map Setup dialog box. Any map that you specified earlier using one of the tools is either modified according to the new specifications or replaced by the newly specified map.

Note If you are using an aperture, its size, shape and orientation should match the aperture specified on the Aperture tab. ▲

Tips Setting up data collection

- When you set up map data collection, keep in mind that using a lower resolution (setting Resolution to a higher number) increases the signal-to-noise ratio (SNR) of the data and may reduce the collection time. This can be an advantage over increasing the number of scans to improve the SNR.
- Since the Aperture parameters are saved with the map sequence, setting them is a good way to keep a record of the aperture used for the experiment even if you are not using the aperture size to specify the step size for the map. You will be able to refer to the settings later when you view the map data.

Setting the optical bench parameters

Before you collect a map, use Bench Setup in the Collect menu of the Atlμs window to set the optical bench parameters for collecting map data. (Do not use Experiment Setup in the Collect menu of the OMNIC window for this purpose.)

➡ How to ➡ Set the optical bench parameters for map data collection

1. **Choose Bench Setup from the Collect menu of the Atlμs window.**

   The Experiment Setup dialog box appears with the Bench tab displayed. Since the parameters and other features in this window also appear in the Experiment Setup dialog box displayed by Experiment Setup in the Collect menu of the OMNIC window, they are documented in the OMNIC Help system. See that Help system if you need more information.

2. **Select the appropriate setting from the Sample Compartment drop-down list box.**

   The following table describes the possible settings (only the settings that are appropriate for your system will be available).

Setting	*Description*
Right μScope; %T	Transmission experiment performed with the microscope installed to the right of the optical bench.
Right μScope; %R	Reflection experiment performed with the microscope installed to the right of the optical bench.
Left μScope; %T	Transmission experiment performed with the microscope installed to the left of the optical bench.
Left μScope; %R	Reflection experiment performed with the microscope installed to the left of the optical bench.
Microscope	Raman experiment performed with the FT-Raman Microprobe Accessory

3. **Select the desired gain setting from the Gain drop-down list box.**

   Autogain is often a good choice.

4. **If you are using an infrared microscope, specify the frequency range (X-axis limits) of the data you want to save.**

   In the Spectral Range box, type the upper limit of the range in the text box on the left and the lower limit in the text box on the right.

   You do not directly specify the frequency range for Raman experiments.

5. **Set the other parameters as desired.**

6. **Choose OK.**

Setting the profile options

Profile Options...

If you plan to collect an area map, you can use Profile Options in the Collect menu of the Atlμs window to specify the type of profile to use and the needed information. The term "profile" is used to refer to any of the ways of representing map data described in the table in the section called "Creating a profile" in the "Map Windows" chapter. See that section for details on the available profile types, including the information you need to enter for each. If you don't specify a profile type, the default profile will be used: Chemigram.

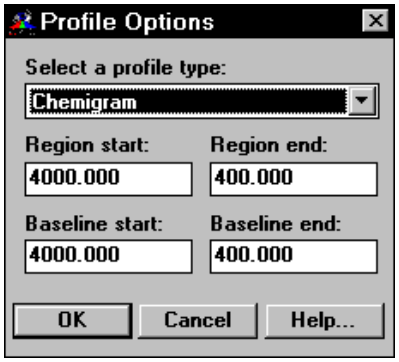
Note Using this command is entirely optional. After you collect the map, you will be able to use the Profile Setup button in the map window to create profiles. ▲

Note The Functional Group and Correlation Map profile types are not available before data collection. ▲

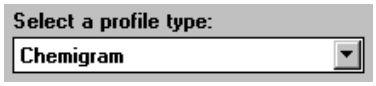
➡ *How to* ➡ Set the profile options

1. **Choose Profile Options from the Collect menu of the Atlµs window.**

   The Profile Options dialog box appears:



2. **Select the desired profile type from the drop-down list box near the top of the dialog box.**



   Depending on the profile type you select, text boxes, a drop-down list box or option buttons may appear allowing you to enter or select the needed information. See the table in the section called “Creating a profile” in the “Map Windows” chapter for a description of these items.

3. **Enter or select the appropriate information.**

4. **Choose OK.**

   When you collect the area map, it will be displayed in the form of the selected profile type using the specified frequency or component information.

➡ *Tips* ➡

Setting the profile options

- The Profile Options command is available only if an area map is defined in the Map Setup dialog box.

Setting the display options

Display Options...

Display Options in the Collect menu of the Atlμs window lets you specify in advance how to display the map data you will collect with the Collect Map command. This command works the same as Display Options in the Atlμs menu, except you set the display options before collecting the data. When the software displays the data immediately after collection, your settings are used. See "Setting the display options" in the "Atlμs Menu Commands" chapter for complete information on setting the display options. See "Collecting sample data" in this chapter for details on collecting map data.

Collecting a sample spectrum at the current stage location

Collect Sample at Current Location

Use Collect Sample At Current Location in the Collect menu of the Atlμs window to collect a sample spectrum at the current stage location. There is no need to use a tool specify a sample point; the spectrum will be collected at the current X,Y location.

➡ *How to* ➡

Collect a sample spectrum at the current stage location

1. **Set the optical bench and data collection parameters.**

   Use Bench Setup in the Collect menu of the Atlμs window to set Sample Compartment for the location of the microscope and the type of collection you are performing. See the OMNIC Help system for more information on Sample Compartment.

Note Do not use Experiment Setup in the Collect menu of the OMNIC window to set Sample Compartment. ▲

Use Map Setup in the Collect menu of the Atlμs window to set Final Format to the format that is appropriate for the kind of data you will be collecting.

2. **Choose Collect Sample At Current Location from the Collect menu of the Atlμs window and then follow the instructions that appear on the screen.**

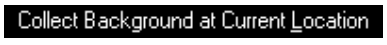
Note If you are collecting ATR data, you need to make contact with the sample. See the documentation that came with your ATR crystal for more information. If you have the required hardware, you can use ATR mode or auto ATR contact to make and release contact with the sample automatically during data collection. See "Collecting ATR data with autofocus" or "Using auto ATR contact" for details. ▲

If you specified in the Map Setup dialog box that a prompt appear before the sample spectrum is collected, a prompt appears asking you to prepare for data collection. Install the aperture if desired (and flip the microscope mirrors if they are not automated) and then choose OK.

The description bar above the tool palette in the Atlμs window shows the progress of the collection.

The collected spectrum appears in a spectral window within the OMNIC window.

Collecting a background spectrum at the current stage location



Use Collect Background At Current Location in the Collect menu of the Atlμs window to collect a background at the current stage location. There is no need to use a tool to specify a background point; the spectrum will be collected the current X,Y location. The collected background becomes the current background and will be used to ratio the sample spectra you collect.

➡ *How to* ➡ Collect a background at the current stage location

1. If you are collecting ATR data, collect a background spectrum through the crystal with no sample in contact.

   See the documentation that came with your ATR crystal for more information.

2. **Choose Collect Background At Current Location from the Collect menu of the Atlμs window.**

   The system collects the background spectrum. The status of the collection appears in the description bar.

Collecting a background

Collect Map Background

After you have specified a background point, you can use Collect Map Background in the Collect menu of the Atlμs window to collect a background at that point. See "Using the tool palette" in the "Atlμs Window" chapter for information on specifying background points.

There does not need to be a current map sequence in order to collect the background. This allows you to collect a background on a sample you are going to map or on another sample, before collecting the map.

If you have specified a background point on the sample to be mapped, a background will be collected at that point as part of the mapping experiment. In that case, there is no need to use Collect Map Background. See "Collecting sample data" for complete information on collecting map data.

See "Collecting backgrounds" in the "Overview" chapter for information on deciding how to collect a background.

➡ *How to* ➡ Collect a background

1. **Use the background point tool to specify the location at which you want to collect a background spectrum.**

   If the line map tool, area map tool or sample point tool is selected, you can also use the right mouse button to click a background location in either the navigation pane or video pane (if present).

Note If you are collecting ATR data, you need to make contact with the background material. See the documentation that came with your ATR crystal for more information. ▲

2. **Choose Collect Map Background from the Collect menu of the Atlμs window.**

   The stage moves to the background point and the system collects the background spectrum. The status of the collection appears in the description bar.

Note If you want the collected background to be used for a map you plan to specify, use Clear in the Edit menu of the Atlμs window to clear the background point before specifying the map. Otherwise, another background will be collected (using the sample) when you collect the map. See “Clearing a map sequence” in the same chapter for information on clearing a background point. ▲

Tips Collecting a background

- Collect the background using an area where there is no sample material present. The best location or material to use for collecting a background varies depending on the sample type or application. The table below provides some suggestions for collecting backgrounds.

Sample Type/Application	*Background*
transmission; sample suspended over air	Air.
transmission; sample on a salt plate	An area of the salt plate where no sample material is present.
transmission; sample in a compression cell	A crystal of KBr (or other halide salt) in the same compression cell, next to the sample.
specular reflection	A mirror or polished metal.
diffuse reflection	Crushed KBr, silicon carbide paper or other rough, non-infrared-absorbing material.
reflection-absorption	A mirror or polished metal, or an area of the sample support where no sample material is present.
grazing angle reflection	A mirror or polished metal, or an area of the sample support where no sample material is present.
ATR	Air.

Collecting sample data

Collect Map

After you define or open a map sequence, use Collect Map in the Collect menu of the Atlμs window to collect a map, or data from discrete points, defined by the sequence. See “Setting up data collection” for details on defining a map sequence. See Opening a map sequence” for information on opening a stored sequence.

How to Collect sample data

1. **Set the optical bench and data collection parameters.**

   Use Bench Setup in the Collect menu of the Atlμs window to set Sample Compartment for the location of the microscope and the type of experiment you are performing. See the OMNIC Help system for more information on the Sample Compartment parameter.

Note Do not use Experiment Setup in the Collect menu of the OMNIC window to set Sample Compartment. ▲

   Use Map Setup in the Collect menu of the Atlμs window to set Final Format to the format that is appropriate for the kind of data you will be collecting. See "Setting up data collection" chapter for information on using Map Setup.

2. **If you are collecting an area map, specify the profile type if desired.**

   You can use Profile Options in the Collect menu of the Atlμs window to specify the profile type and associated information such as peak locations, spectral regions, baselines or a component to quantify. See "Setting the profile options" for complete information.

Chemigram A type of profile that shows the integrated spectral intensity of a specified spectral region for each sample point.

   If you don't specify a profile type, the default profile will be used: Chemigram.

3. **If you will be collecting a background using the sample, place the sample on the stage and specify the map sequence or open a stored sequence.**

   If you want to collect a map background using a different material, place that material on the stage, specify a background point and collect the background.

Note If you are collecting ATR data, you need to make contact with the sample. See the documentation that came with your ATR crystal for more information. If you have the required hardware, you can use ATR mode or auto ATR contact to make and release contact with the sample automatically during data collection. See "Collecting ATR data with autofocus" or "Using auto ATR contact" for details. ▲

To specify a map sequence, use the Atlμs window tool palette and Map Setup in the Collect menu. See "Using the tool palette" in the "The Atlμs Window" chapter for details on using the tools to specify a map sequence. See "Opening a map sequence" in the "Atlμs Window Menus" chapter for details on opening a stored sequence.

To collect a map background using a material other than the sample, use Collect Map Background in the Collect menu of the Atlμs window. After you collect the background, use Clear in the Edit menu of the Atlμs window to clear the background point from the navigation pane, place the sample on the stage and specify the map sequence using the Atlμs window tool palette and Map Setup in the Collect menu. See "Collecting a background" in the "Atlμs Window Menus" chapter for details on collecting a background spectrum. See "Clearing a map sequence" in the same chapter for information on clearing a background point.

4. **If you turned on Save Video Images In Map File in the Map Setup dialog box, remove the aperture from the microscope.**

Note If you have a Continuμm microscope, the aperture cannot be removed. Instead, turn off the Reflex aperture illuminator to cause the aperture image to disappear. ▲

5. **Choose Collect Map from the Collect menu of the Atlμs window and then follow the instructions that appear on the screen.**

The map window does not appear if you are collecting data at discrete sample points, including those in an ordered array.

A map window appears below the Atlμs window and map data collection begins. The description bar above the tool palette in the Atlμs window shows the progress of the collection. If the video pane is displayed, cross hairs move to each sample point in the pane as the corresponding spectrum is collected.

If you turned on Save Video Images In Map file and Prompt Before Collecting Data in the Map Setup dialog box, a prompt appears asking you to prepare to capture the video images. If you have not already removed the aperture from the microscope, remove it now (if you have a Continuμm microscope, see the Note in step 4). Then choose OK. The images are captured and saved on the hard disk.

If you turned on Prompt Before Collecting Data in the Map Setup dialog box, a prompt appears asking you to prepare for map data collection. Install the aperture (and flip the microscope mirrors if they are not automated) and then choose OK.

Note If you have a Continuμm microscope, adjust the aperture as desired. ▲

Each sample spectrum appears in the map window (if displayed) while the spectrum is being collected.

If you want to stop data collection, click the Stop button in the Atlμs window.

You can pause data collection by clicking the Pause button. This allows you to refocus the microscope or make contact with an ATR sample.

6. **When data collection is finished, save the map or discrete point data.**

   - If you are collecting a map, the Save As dialog box appears after all the spectra have been collected to allow you to save the data. Use the extension .MAP when giving the map a filename. After you have saved the data, it appears in a map window and you can begin working with it.

     - If you collected a line map, a waterfall showing the collected spectra is displayed. (To display the line contour map, click the Show Contour option button.)

     - If you collected an area map, an area contour map is displayed.

   - If you collected spectra at individually specified sample points, the collected spectra are displayed in a standard spectral window. You can save the spectra by using Save in the File menu of OMNIC.

   If any errors occurred during data collection, a window appears listing the errors in chronological order. Close the window after you read the error descriptions.

Tips Collecting sample data

- The Collect Map command is available only if there is a current map sequence. A current map sequence is one you have just defined using Map Setup or the tool palette or one you have opened using Open in the File menu of the Atlμs window.

View menu commands

Use the commands in the View menu of the Atlµs window to specify how to display maps and map annotation in the navigation and video panes. The following table shows what you can do with each command.

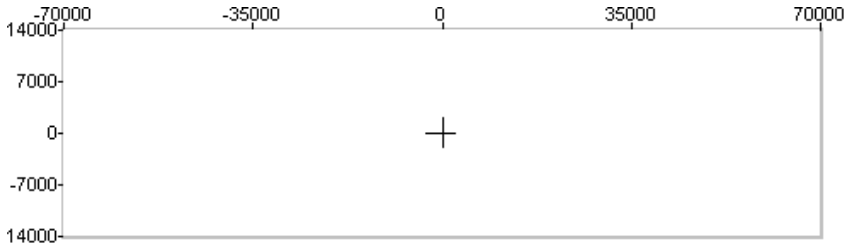
To do this...	*Use this command...*
Display the full range of stage travel.	Full View
Zoom in on a map in the navigation pane.	Zoom To Points
Match the navigation pane to the video pane.	Match Video
Display annotation in the video image or turn off the display of annotation.	Video Annotation

The next sections explain in detail how to use each command.

Displaying the full range of stage travel

Full View

Use Full View in the View menu of the Atlµs window to display the full range of stage travel in the navigation pane (see the following illustration).



This is useful if you have zoomed in using the arrow tool or zoom in button and need to zoom out to see the full range.

➡ *How to* ➡ Display the full range of stage travel

Choose Full View from the View menu.

The full range of stage travel is then displayed in the navigation pane.

Zooming in on a map

Use Zoom To Points in the View menu of the Atlµs window to instantly zoom in on a map displayed in the navigation pane. This is useful if you have zoomed out from the map to view a larger stage area and the map is now displayed too small to be seen clearly.

➡ *How to* ➡ Zoom in on a map

Choose Zoom To Points from the View menu of the Atlµs window.

The software zooms in on the map so that it is clearly visible in the navigation pane.

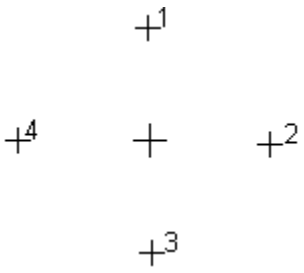
➡ *Tips* ➡ Zooming in on a map

- If you have used the sample point tool to specify two endpoints for a large line map or two or more boundary points for a large area map in the video pane, Zoom To Points makes it easy to zoom in on these points in the navigation pane. You can then use the line map tool or area map tool to draw the map by connecting or encompassing the points.

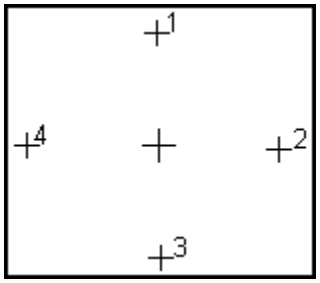
  As an example, consider a sample with four dark spots that you want to analyze. The spots are arranged in a diamond pattern, and the area in which the spots are located covers many video frames.

You first mark each spot in the video pane with the sample point tool, being sure to locate the sample point cross hairs “outside” the spots (that is, away from the center of the diamond pattern). For example, the spot at the “top” of the diamond pattern would be marked like this:

When you choose Zoom To Points, all four numbered sample points are displayed in the navigation pane:



You then draw the area map so that all four sample points are inside the area:



This ensures that the four spots will be within the mapped area.

Matching the navigation pane to the video pane

Match Video

Use Match Video in the View menu of the Atlµs window to quickly change the area represented by the navigation pane so that it matches the view of the sample in the video pane. Both panes then have the same range of stage coordinates. Here is an example:

How to

Match the navigation pane to the video pane

Choose Match Video from the View menu of the Atlµs window.

The stage coordinates of the navigation pane are changed to match those of the video pane.

A check mark appears next to the command name when the command is on:

✔ Match Video Ctrl+V

As long as the command is on, the navigation pane coordinates will match those of the video pane.

To turn off the command, choose it while the check mark is present. The check mark is removed, indicating that the command has been turned off. You can then change the navigation pane coordinates as desired.

Displaying annotation in the video pane

Video Annotation

Use Video Annotation in the View menu of the Atlµs window to turn the display of map annotation in the video pane on or off.

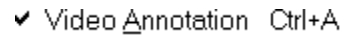
Video annotation includes line maps, area maps, circular and rectangular drawn apertures, text annotation, rulers and sample and background points.

How to

Display video annotation

Choose Video Annotation from the View menu of the Atlµs window.

A check mark appears next to the command name when the command is on:



When the command is on, any video annotation you have specified for the current map sequence appears in the video pane.

To turn off the display of video annotation, turn the Video Annotation command off by choosing it when the check mark is present. The check mark is removed to indicate that the command has been turned off, and the annotation is no longer displayed in the video pane. Maps and background points continue to be displayed in the navigation pane when the command is off. Drawn apertures can be displayed only in the video pane, when the command is on.

Tips

Displaying video annotation

- If your view of the sample is obscured by annotation, you can turn off the display of annotation temporarily while you view the sample.
- If the display of annotation is on, the annotation, cross hairs and axes are included when you print, copy or save the video image.

Image menu commands

Use the commands in the Image menu to work with video images displayed in the navigation pane and video pane. The following table shows what you can do with each command.

To do this...	*Use this command...*
Set the video parameters.	Video Source
Copy the video image displayed in the video pane to the Clipboard.	Copy Video Image
Save the video image displayed in the video pane.	Save Video Image
Capture a Mosaic of video images within the specified area of the sample and display them in the navigation pane as one image of the entire area.	Capture Mosaic
Clear the Mosaic of video images from the navigation pane.	Clear Mosaic
Save the captured Mosaic of video images in a file.	Save Mosaic
Copy the captured Mosaic of video images to the Clipboard.	Copy Mosaic
Print the captured Mosaic of video images on paper.	Print Mosaic
Open a calibration file.	Open Calibration
Calibrate the video image displayed in the video pane.	Create Calibration

(continued on next page)

To do this...	*Use this command...*
View information about the calibration.	Calibration Information
Change the video image displayed in the video pane to 160 by 120 pixels.	160 x 120
Change the video image displayed in the video pane to 240 by 180 pixels.	240 x 180
Change the video image displayed in the video pane to 320 by 240 pixels.	320 x 240
Change the video image displayed in the video pane to 640 by 480 pixels.	640 x 480

The next sections explain in detail how to use each command.

Setting the video parameters

Use Video Source in the Image menu to specify how you want the video driver to display the video image.

Video Source...

➡ *How to* ➡ Set the video parameters

1. **Choose Video Source from the Image menu.**

   The Video Setup dialog box appears. This dialog box is displayed by your video driver software. See the manual that came with that software for complete information on using the dialog box.

2. **Set the parameters as desired.**

   Use the scroll bars in the Adjustments box to set the brightness, contrast, hue and saturation of the video image. The current value appears to the right of each scroll bar. The limits of the allowed range for each parameter appear above the scroll arrows.

   Select the type of input you are using in the Input Type box. Depending on the hardware you have, the available types can include Composite 1, Composite 2 and S-Video.

   If you have a VG2X-PCI video image card, specify the type of camera signal that your camera provides by selecting PAL (the European standard) or NTSC (the standard in the U.S.A. and Japan) in the Source box. (If you have a Thermo Nicolet G-XT video image card, the signal type is determined automatically.)

   To save your changes for the next time you run the software, use the Save button. If you choose OK without saving your changes, they will be in effect only during the current use of the application; the former settings will be used the next time you start OMNIC Atlμs or open the Atlμs window with Show Atlμs Window in the Atlμs menu.

3. **When you are finished using the Video Setup dialog box, choose OK.**

   To close the Video Setup dialog box without using your changes during this work session, choose Reset and then OK. (If you saved the changes, they will still be used the next time you start OMNIC Atlμs or open the Atlμs window with Show Atlμs Window in the Atlμs menu.)

Copying the video image to the Clipboard

Copy Video Image

Use Copy Video Image in the Image menu to copy the video image displayed in the video pane, at its current size, to the Clipboard, replacing the current Clipboard contents. If Video Annotation is turned on in the View menu, any displayed annotation, cross hairs and axes are included when you copy the image. The copied image remains on the Clipboard until you perform another copy or cut operation using any application or until you exit Windows.

How to

Copy the video image to the Clipboard

1. **Adjust the display size of the video image as desired.**

   Use 160 x 120, 240 x 180, 320 x 240 or 640 x 480 in the Image menu to select a display size. A check mark appears in the menu to indicate the current size. The use of these commands is explained later in this chapter.

2. **Choose Copy Video Image from the Image menu.**

   The video image is copied to the Clipboard.

Tips

Copying the video image to the Clipboard

- You can paste the copied video image into a graphics application and add annotation on top of the image. You can also paste the image into a word processing application that allows graphics.
- The video image is copied using the same pixel resolution as the displayed image. (If Video Annotation is turned on in the View menu, pixels are added around the image for the axes.)

Saving the video image

Save Video Image

Use Save Video Image in the Image menu to save the video image displayed in the video pane, at its current size, as a 24-bit, true-color, bitmap (BMP) file. If Video Annotation is turned on in the View menu, any displayed annotation, cross hairs and axes are included when you save the image. You can open the file later using an application that opens bitmap files.

How to Save the video image

1. **Adjust the display of the video image as desired.**

   Use 160 x 120, 240 x 180, 320 x 240 or 640 x 480 in the Image menu to select a display size. A check mark appears in the menu to indicate the current size. The use of these commands is explained later in this chapter.

2. **Choose Save Video Image from the Image menu.**

   The Save As dialog box appears.

3. **Type a filename in the File Name text box.**

   Use the extension .BMP for the filename.

4. **Select the directory where you want the image saved.**

5. **Choose OK.**

Tips Saving the video image

- The video image is saved using the same pixel resolution as the displayed image.

Capturing a Mosaic of video images for a sample area

Capture Mosaic

Use Capture Mosaic in the Image menu to capture a Mosaic of video images within a specified area of the sample and display it in the navigation pane as one image of the entire area. Assembling video images in this manner is useful when you are defining a map that is larger than one video frame or want a video record of a large sample area.

Note This Mosaic is not the same Mosaic that you can display in a map window using Show Video Mosaic in the Atlμs menu of the OMNIC window (although it could show nearly the same area of the sample). That Mosaic is captured just before data collection if you have turned on Save Video Frames In Map File in the Map Setup dialog box. ▲

Mosaic An assembly of video images of a sample area.

When you capture a Mosaic of a sample area, the software moves the stage to position each portion of the specified area under the objective so that a video frame can be captured and stored for later assembly. If you selected Focus After Each Stage Movement in the Focus Settings dialog box, the system automatically focuses each frame before it is captured.

Here is an example showing several video images assembled as a Mosaic and displayed in the navigation pane:

Although the size and shape of the Mosaic may not exactly match the size and shape of the specified area, the entire specified area is always included in the captured images.

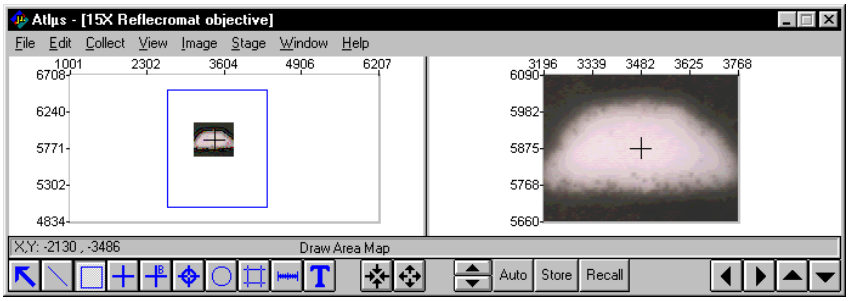
Once the Mosaic is captured and displayed, you can zoom in on any part of it and draw a map anywhere on it. You can also save the Mosaic in a file that can be opened later, copy it to the Clipboard for pasting into a document, or print it on paper. See “Saving a Mosaic,” “Copying a Mosaic” and “Printing a Mosaic” for more information. See “Displaying a stored Mosaic” in the “Atlμs Menu Commands” chapter for information on opening a saved Mosaic and displaying it in a map window.

To clear the Mosaic from the screen, use Clear Mosaic in the Image menu. See “Clearing a Mosaic from the navigation pane” for details.

➡ How to ➡ Capture a Mosaic

1. **Use the area map tool to draw a box in the navigation pane around the area of the sample for which you want a video record.**

   Here is an example:



2. **Choose Capture Mosaic from the Image menu.**

   The system captures video images of the specified area and displays them as a Mosaic in the navigation pane.

   If you want to stop the capture process before completion, click the Stop button. The video images captured so far, except the image that matches the video pane, are cleared from the screen.

➡ Tips ➡ Capturing a Mosaic

- Before you capture a Mosaic, make sure the current calibration file is the correct calibration for the objective you are using. This ensures that the video images that make up the Mosaic appear well aligned, with their edges neatly connected. See “Opening a calibration file” for more information.

- The color of the captured video images may change when they are reduced in size. To improve the appearance of the images, zoom in on them.

Clearing a Mosaic from the navigation pane

Clear Mosaic

After you have used Capture Mosaic in the Image menu to display a Mosaic of video images for a sample area, you can use Clear Mosaic in the Image menu to clear from the navigation pane all of the images except the image that matches the video pane. See "Capturing a Mosaic of video images for a sample area" for more information on displaying a Mosaic in the navigation pane.

How to

Clear a Mosaic

Choose Clear Mosaic from the Image menu.

All the video images except the image that matches the video pane are removed from the navigation pane.

Tips

Clearing a Mosaic

- Be sure you want to clear the Mosaic before using this command. If you change your mind after clearing the images, you will have to capture all of them again to restore the Mosaic.

Copying a Mosaic

Copy Mosaic

After you have used Capture Mosaic in the Image menu to display a Mosaic of video images for a sample area, you can copy the Mosaic, along with the navigation pane axes, to the Clipboard by using Copy Mosaic in the Image menu. You can then paste the Mosaic into a document using a word processing program or other program that lets you paste items from the Clipboard. See "Capturing a Mosaic of video images for a sample area" for more information on displaying a Mosaic in the navigation pane.

How to

Copy a Mosaic

Choose Copy Mosaic from the Image menu.

The Mosaic is copied to the Clipboard.

Saving a Mosaic

Save Mosaic...

After you have used Capture Mosaic in the Image menu to display a Mosaic of video images for a sample area, you can save the Mosaic, along with the navigation pane axes, in a bitmap file by using Save Mosaic in the Image menu. You can then open the file using a program that opens bitmaps. See "Capturing a Mosaic of video images for a sample area" for more information on displaying a Mosaic in the navigation pane.

➡ *How to* ➡ Save a Mosaic

1. **Choose Save Mosaic from the Image menu.**

   The Save As dialog box appears.

2. **Type a filename in the File Name text box.**

   Use the extension .BMP for the filename.

3. **Select the directory where you want the Mosaic saved.**

4. **Choose Save.**

Printing a Mosaic

Print Mosaic...

After you have used Capture Mosaic in the Image menu to display a Mosaic of video images for a sample area, you can print the Mosaic, along with the navigation pane axes, on paper by using Print Mosaic in the Image menu. See "Capturing a Mosaic of video images for a sample area" for more information on displaying a Mosaic in the navigation pane.

➡ *How to* ➡ Print a Mosaic

1. **Choose Print Mosaic from the Image menu.**

   The Print dialog box appears allowing you to set the parameters for printing.

2. **Set the parameters as desired and then choose OK.**

Opening a calibration file

Open Calibration...

If you have changed the microscope objective, you can use Open Calibration in the Image menu to open a calibration file to quickly reset the software for collecting data with that objective. By opening the appropriate calibration file, you avoid having to recalibrate the system. See "What is calibration" in the "Overview" chapter for a discussion of calibration. See the next section, "Calibrating the video image," for an explanation of how to create a calibration file.

When you start OMNIC Atlµs or open the Atlµs window with Show Atlµs Window in the Atlµs menu, the calibration file that was used last becomes the current calibration.

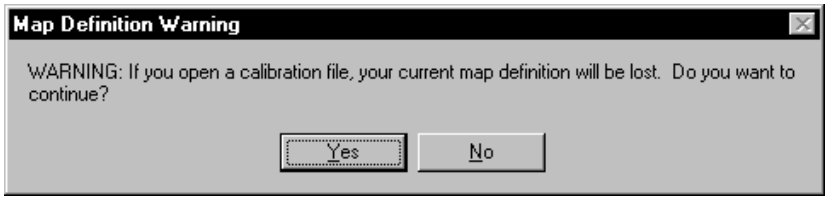
See "What is calibration?" in the "Overview" chapter for a discussion of video image calibration.

How to

Open a calibration file

1. **Choose Open Calibration from the Image menu.**

   If you have defined a map sequence that is currently displayed, the following message appears warning that the sequence will be cleared when you open a calibration file:



   To continue, choose Yes. If you want to save the sequence, choose No and then save the sequence before using Open Calibration again. See "Saving a map sequence" for more information.

The Open Calibration File dialog box appears listing the available calibration files, which have the extension .CAL. The default directory is the directory of the last calibration file that was opened or saved.

2. **Type the name of the file you want to open, or locate and select a file.**

   You can change directories or drives to locate the file you want to open.

   If a description was entered when the calibration file was created, the description appears at the bottom of the dialog box when you select the file.

3. **Choose OK.**

   The opened calibration file becomes the current calibration. The video pane changes to reflect any dimension changes required by the new calibration.

Tips

Opening a calibration file

- Before collecting a map, use Calibration Information in the Image menu to make sure the calibration information is correct.

Calibrating the video image

Use Create Calibration in the Image menu to create a new calibration file containing the current calibration information for the video pane.

Whenever the size of the video field of view changes (because you have changed the microscope objective), you need to calibrate the video image to coordinate what is displayed in the video pane with the actual field of view. That is, the number of micrometers displayed in the video pane must match the number of micrometers in the field of view. The calibration is very important. If you don't calibrate the video image, any maps you define are invalid because the software is unable to map the correct region of interest.

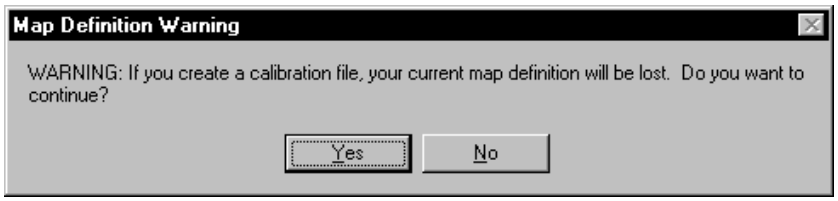
See “What is calibration?” in the “Overview” chapter for more discussion of video image calibration.

Note If there is no default calibration file, choosing Create Calibration from the Image menu is unnecessary since the Create Calibration window appears automatically the first time the software is started. ▲

➡ *How to* ➡ Calibrate the video image

1. **Choose Create Calibration from the Image menu.**

   If you have defined a map sequence that is currently displayed, the following message appears warning that the sequence will be cleared when you create the calibration:

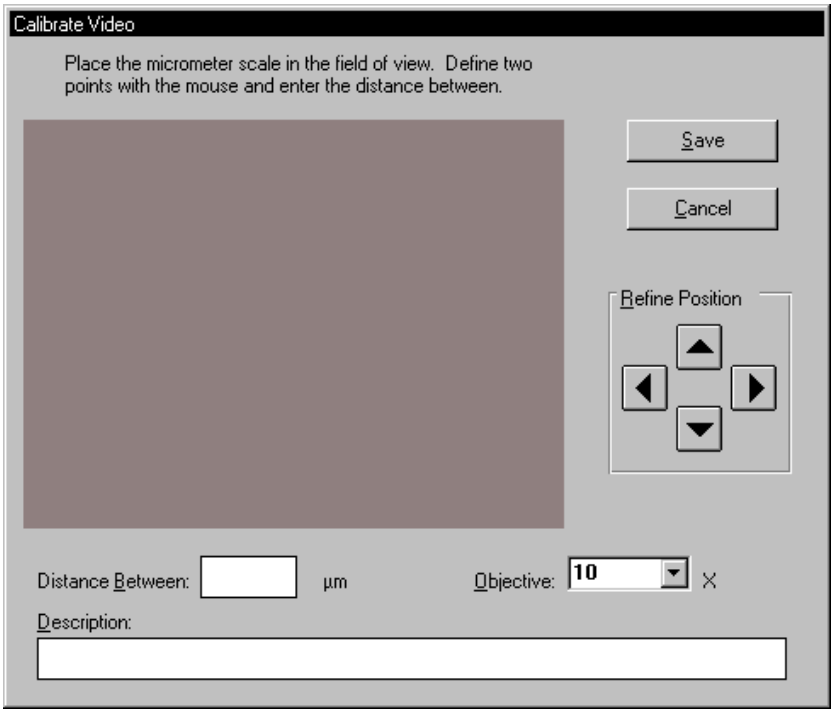


   To continue, choose Yes.

   If you want to save the sequence, choose No and then save the sequence before using Create Calibration again. See “Saving a map sequence” for more information.

   The video pane changes to show a live image (if it is not already live).

The Calibrate Video window appears showing the scale within a video image.



2. **Place a micrometer scale on the stage and focus on the scale.**

   If your micrometer scale is on a transparent slide, you will probably find it easier to see the scale if you set the microscope and illumination for transmission operation.

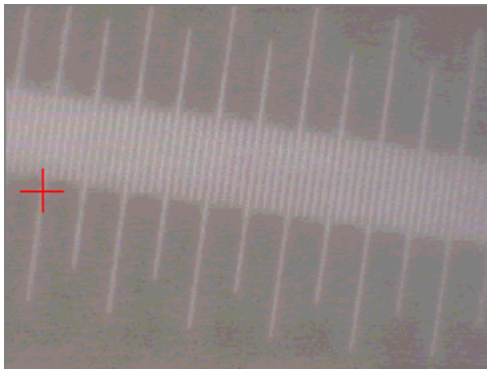
   You need to have a known distance visible on the scale. The scale need not be horizontal or vertical in the image (see the example shown in the next step).

3. **If you have a Continuµm microscope, select the magnification of the objective you are using from the Objective drop-down list box.**

4. **Click one of the division marks of the scale displayed in the video image.**

   The point you click will be used along with a second clicked point to indicate a known distance on the scale.

   A red cross hairs marker appears at the point you clicked. Here is an example:



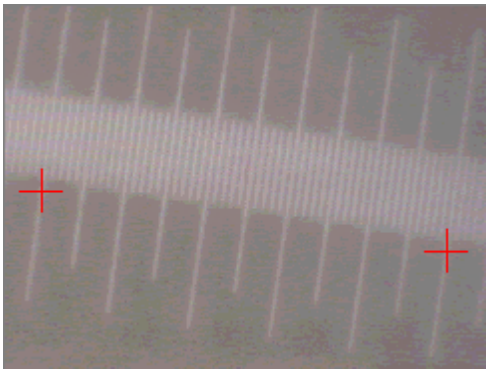
   If you are not satisfied with the position of the marker, you can adjust it by clicking the arrow buttons in the Refine Position box. The direction of the arrow on each button shows the direction the marker will move when you click the button. Each time you click a button, the marker moves a distance of one pixel. Position the marker on the center of the division mark.

   You will also be able to move the marker with the mouse after both points have been clicked (this is explained in the next step).

5. **Click another division mark of the scale.**

   Click a division mark that is a suitable distance from the first point. The calibration will be more accurate if your points are widely spaced on the screen.

A red cross hairs marker appears at the point you clicked:



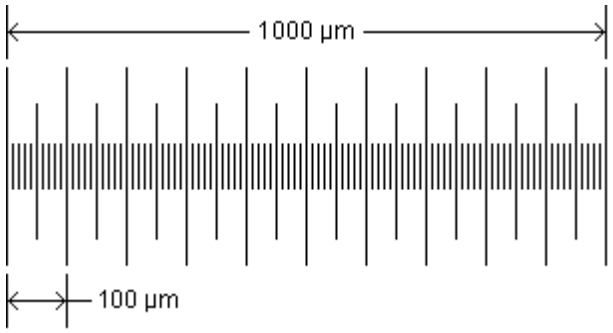
You can adjust the position of the marker by using the arrow buttons as described in the preceding step.

In addition, now that both points have been clicked, you can use the mouse to move the marker for either point. To move the marker, drag it to the desired location. When you drag or click a marker, it is displayed in red to show that it is selected; the marker for the other point is displayed in blue.

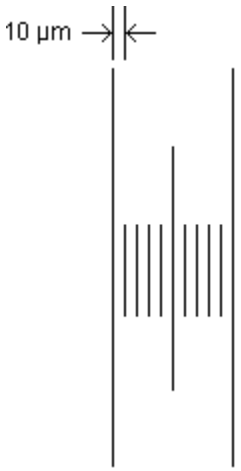
You can always use the arrow buttons in the Refine Position box to adjust the position of the selected marker. Each time you click a button, the selected marker moves a small distance in the direction of the arrow.

6. **Use the image of the scale to determine the distance between the two markers, and then type the distance in micrometers in the Distance Between text box.**

   The following illustration identifies the distance between the marks on an Olympus 0.01 mm scale (your scale may be different).



View of entire scale



Close-up of portion of scale

7. **Type a detailed description of the calibration in the Description text box.**

   It's helpful to include a description of the objective that was used for the calibration.

   The description is a good way to record what the calibration file was created for. (An example of a description is "15X Cassegrainian objective, Nic-Plan.") When you select the file in the Open Calibration File dialog box, the description will appear at the bottom of the dialog box. You will find the description more useful than the short filename when you are trying to locate a particular calibration file. See "Opening a calibration file" for details on opening a calibration file.

   The description will also appear in the Calibration Information dialog box when you choose Calibration Information from the Image menu while the calibration file is in use (see "Viewing information about the calibration").

8. **Choose Save.**

   The Save Calibration As dialog box appears.

9. **Type a filename in the File Name text box.**

   Use the extension .CAL.

10. **Select the directory where you want the calibration saved.**

11. **Choose OK.**

    The calibration file becomes the current calibration.

Note This file will be the calibration file used when you next start OMNIC Atlμs or open the Atlμs window with Show Atlμs Window in the Atlμs menu. ▲

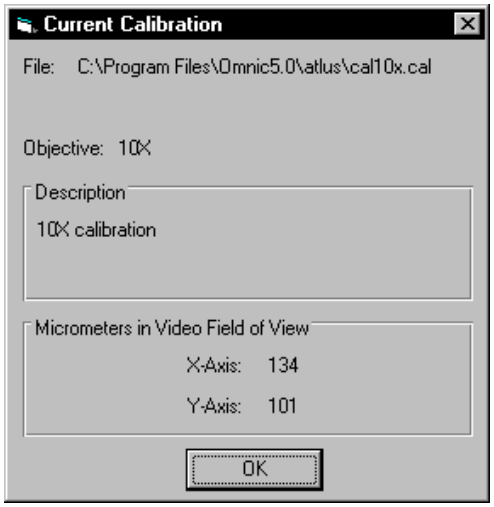
Tips Calibrating the video image

- To make it easier to locate calibration files later, save them all in the same directory and give them descriptive filenames (for example, 15XOBJ.CAL or 10XGLASS.CAL).
- To verify that the video image has been calibrated correctly, use the stage movement tool to click a location in the video image. If that location moves to the center of the video pane, the video image has been calibrated correctly.

Viewing information about the calibration

Calibration Information...

It is important for you to verify that the current calibration file is the correct calibration for the current microscope objective. You can do this by using Calibration Information in the Image menu. The Current Calibration dialog box displays the current calibration information. Here is an example showing the information for a calibration:



The following table describes the information contained in the dialog box:

Information	*Description*
File	The pathname of the current calibration file.
Objective	The magnification you specified for a Continuμm microscope objective when you created the calibration. (This information is not available for other microscopes.)
Description	The description that was entered when the current calibration file was created.
X-Axis	The number of micrometers in the video image field of view in the X dimension.
Y-Axis	The number of micrometers in the video image field of view in the Y dimension.

See "Calibrating the video image" for information on creating a calibration file.

➡ *How to* ➡ View information about the calibration

1. **Choose Calibration Information from the Image menu.**

   The Calibration Information dialog box appears.

2. **Check the information and then choose OK to close the dialog box.**

   If the calibration information is not appropriate for your experiment, open or create another calibration file.

Tips

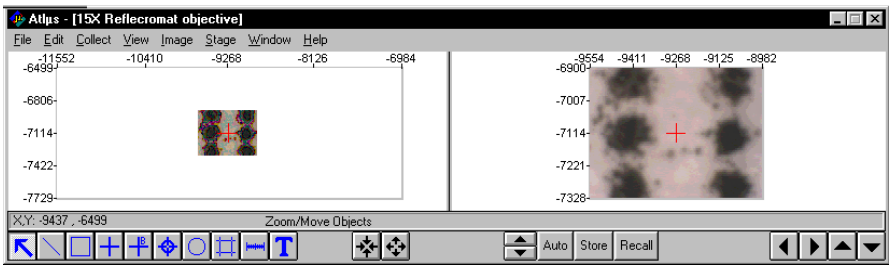
Viewing information about the calibration

- Calibration Information is available in the Image menu only if there is a current calibration file.

Changing the video image to 160 by 120 pixels

160 x 120

Use the 160 x 120 command in the Image menu to change the size of the video image displayed in the video pane to 160 by 120 pixels. Here is an example:



How to

Change the video image to 160 by 120 pixels

Choose 160 x 120 from the Image menu.

The video image size is changed to 160 by 120 pixels. The Atlμs window is resized to fit the width of the screen, and the height of the OMNIC window is adjusted to accommodate the Atlμs window.

A check mark appears next to the command name to indicate the current image size:

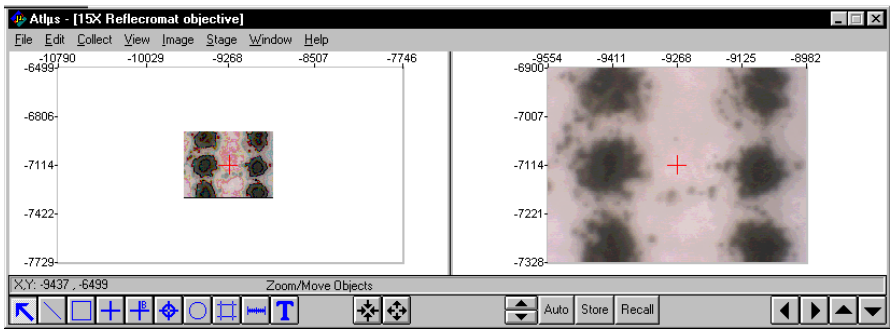
✔ 160 x 120

If you change the video image size by choosing 240 x 180, 320 x 240 or 640 x 480 from the Image menu, the check mark is removed.

Changing the video image to 240 by 180 pixels

240 x 180

Use the 240 x 180 command in the Image menu to change the size of the video image displayed in the video pane to 240 by 180 pixels. Here is an example:



How to Change the video image to 240 by 180 pixels

Choose 240 x 180 from the Image menu.

The video image size is changed to 240 by 180 pixels. The Atlμs window is resized to fit the width of the screen, and the height of the OMNIC window is adjusted to accommodate the Atlμs window.

A check mark appears next to the command name to indicate the current image size:

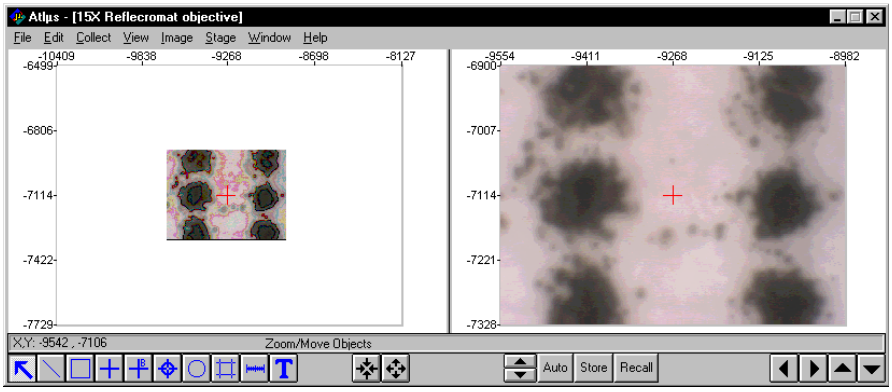
✔ 240 x 180

If you change the video image size by choosing 160 x 120, 320 x 240 or 640 x 480 from the Image menu, the check mark is removed.

Changing the video image to 320 by 240 pixels

320 x 240

Use the 320 x 240 command in the Image menu to change the size of the video image displayed in the video pane to 320 by 240 pixels. Here is an example:



How to

Change the video image to 320 by 240 pixels

Choose 320 x 240 from the Image menu.

The video image size is changed to 320 by 240 pixels. The Atlμs window is resized to fit the width of the screen, and the height of the OMNIC window is adjusted to accommodate the Atlμs window.

A check mark appears next to the command name to indicate the current image size:

✔ 320 x 240

If you change the video image size by choosing 160 x 120, 240 x 180 or 640 x 480 from the Image menu, the check mark is removed.

Tips

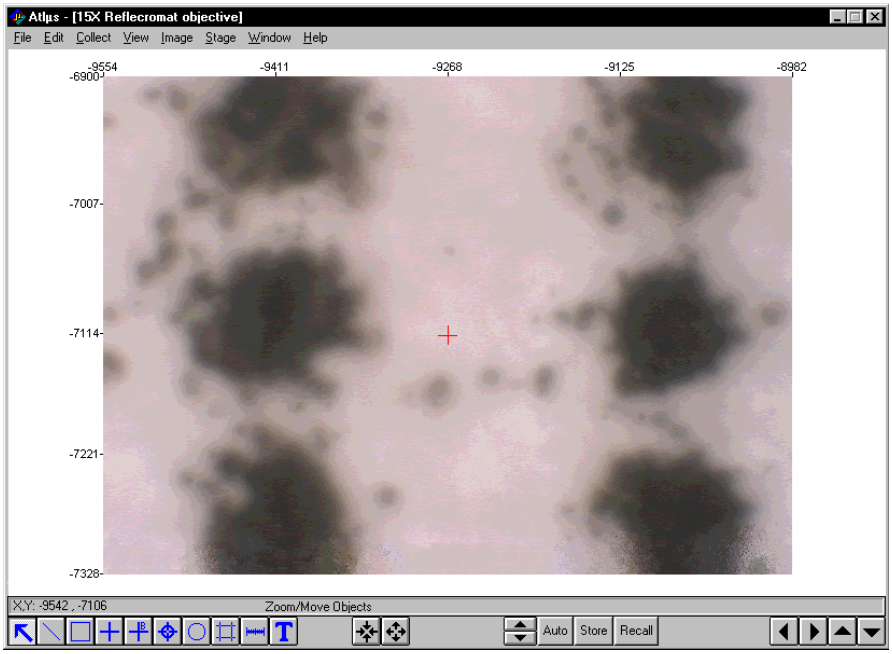
Changing the video image to 320 by 240 pixels

- Enlarging the video pane with the 320 x 240 command can make it easier to draw an aperture the desired size.

Changing the video image to 640 by 480 pixels

640 x 480

Use 640 x 480 in the Image menu to change the size of the video image displayed in the video pane to 640 by 480 pixels. Here is an example:



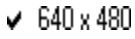
How to

Change the video image to 640 by 480 pixels

Choose 640 x 480 from the Image menu.

The video image size is changed to 640 by 480 pixels, and the navigation pane and OMNIC window are removed from the screen.

A check mark appears next to the command name to indicate the current image size:



If you change the video image size by choosing 160 x 120, 240 x 180 or 320 x 240 from the Image menu, the check mark is removed.

Tips Changing the video image to 640 by 480 pixels

- Enlarging the video pane with the 640 x 480 command can make it easier to draw an aperture the desired size.

Stage (or Continuµm) menu commands

Use the commands in the Stage menu (renamed the Continuµm menu if you have a Continuµm microscope) to perform the operations listed in the following table.

To do this...	*Use this command...*
Move the stage to the origin point (0,0).	Go To Origin
Move the stage to a specified point or by steps of a specified size.	Move Stage
Select serial ports for communicating with the stage and autofocus equipment.	Set Serial Port
Set the automated Reflex aperture to the default size.	Set Aperture To Default
Set the automated Reflex aperture numerically.	Aperture Dimensions
Set the autofocus options.	Focus Settings

Moving the stage to the origin point

Use Go To Origin in the Stage menu to move the stage to the origin point (0,0).

Go to Origin

How to

Move the stage to the origin point

Choose Go To Origin from the Stage menu of the Atlµs window.

The stage moves to the origin point.

origin The position on the microscope stage whose X and Y coordinates are 0,0.

Moving the stage to a specified point or by specified steps

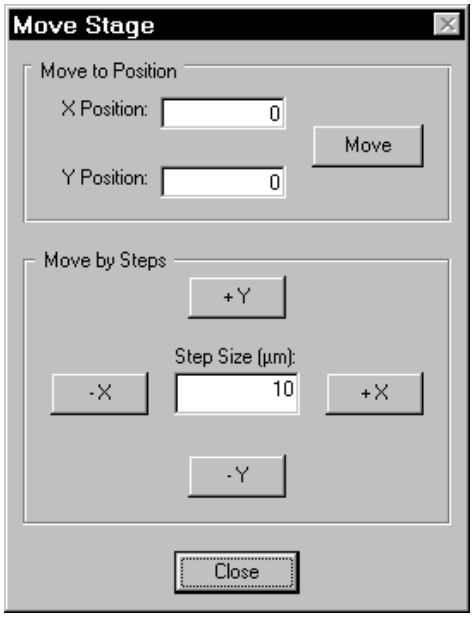
Move Stage...

Use Move Stage in the Stage menu to move the stage in either of two ways: You can move the stage in one operation to a point whose coordinates you specify. You can also move the stage incrementally along its X-axis or Y-axis.

How to Move the stage

1. **Choose Move Stage from the Stage menu.**

   The Move Stage dialog box appears showing the current X and Y stage coordinates in the Move To Position box.



2. **Move the stage as desired.**

   - To move the stage to a numerically specified point, type the desired X and Y coordinates in the X Position and Y Position text boxes in the Move To Position box, and then click the Move button. The stage moves to the specified point.

- To move the stage a specified distance along its X-axis or Y-axis, type the desired distance in the Step Size (µm) text box in the Move By Steps box, and then click the button labeled with the desired direction of movement.

  The following table explains how the buttons move the stage.

This button...	*Does this...*
-X	Moves the stage to the right to display a portion of the sample that is to the left of the current video frame. The stage X coordinate decreases.
+X	Moves the stage to the left to display a portion of the sample that is to the right of the current video frame. The stage X coordinate increases.
+Y	Moves the stage toward the front to display a portion of the sample that is "above" the current video frame. The stage Y coordinate increases.
-Y	Moves the stage toward the rear to display a portion of the sample that is "below" the current video frame. The stage Y coordinate decreases.

  Each time you click a button, the stage moves the specified distance in the indicated direction. This allows you to move the stage incrementally toward or away from a sample feature.

3. **When you are finished moving the stage, choose Close.**

Selecting serial ports for communication

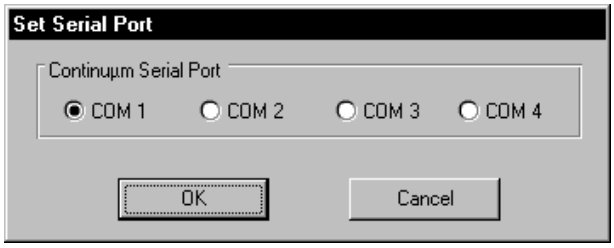
Set Serial Port...

If you have a Continuµm microscope, use Set Serial Port in the Continuµm menu to select a serial port for communicating with the microscope. If you have another microscope model, use Set Serial Port in the Stage menu to select serial ports for communicating with the stage and autofocus equipment (if installed).

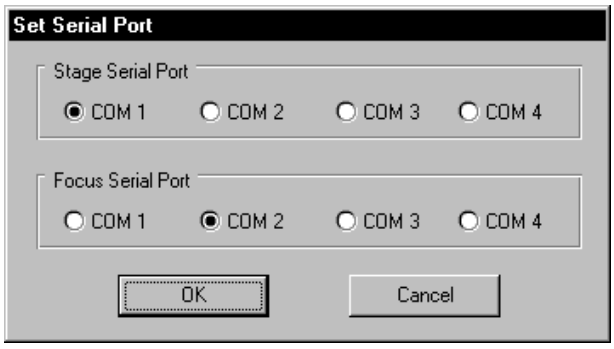
➡ *How to* ➡ Select serial ports

1. **Choose Set Serial Port from the Continuµm (or Stage) menu.**

   If you have a Continuµm microscope, the following dialog box appears.



   If you have a microscope other than a Continuµm, the following dialog box appears. (The Focus Serial Port options are available only if the microscope has the optional autofocus feature.)



2. **Specify the serial ports by selecting the appropriate options.**

   If you have a microscope other than a Continuµm and it has the optional autofocus feature, the port for autofocus must be different from the port for the stage.

3. **Choose OK.**

Setting the automated Reflex aperture to the default

Set Aperture to Default

If you have a Continuµm microscope with the optional automated Reflex aperture system (must be installed by Thermo Nicolet), you can quickly set the Reflex aperture to the default size and zero degrees of rotation by using Set Aperture To Default in the Continuµm menu. If you are using an objective with a magnification of 15X or less, the default size is 100 by 100 micrometers. If you are using an objective with a magnification greater than 15X, the default size is 50 by 50 micrometers.

Note The software bases the default aperture on the setting of the Objective parameter that was saved in the current calibration file. ▲

➡ *How to* ➡ Set the automated Reflex aperture to the default

Choose Set Aperture To Default from the Continuµm menu.

Setting the automated Reflex aperture numerically

Aperture Dimensions...

If you have a Continuµm microscope with the optional automated Reflex aperture system (must be installed by Thermo Nicolet), you can use Aperture Dimensions in the Continuµm menu to adjust the size, shape and orientation of the aperture by entering numerical values.

Important Use only the software to adjust the aperture; do *not* use the Reflex aperture control knobs on the microscope. If you do adjust the knobs, you will need to turn the microscope power off and on. Follow these precautions: If the microscope has a motorized stage or the autofocus option, remove the nosepiece and lower the condenser all the way before turning on the power. After the microscope has initialized, reinstall the nosepiece. ▲

Note The minimum size of the automated Reflex aperture is nominally 5 by 5 micrometers. If you attempt to set the aperture to this or a smaller size, the system will automatically adjust the aperture to the minimum size possible on your microscope (typically, 8 by 8 micrometers). The minimum available size varies slightly from system to system. ▲

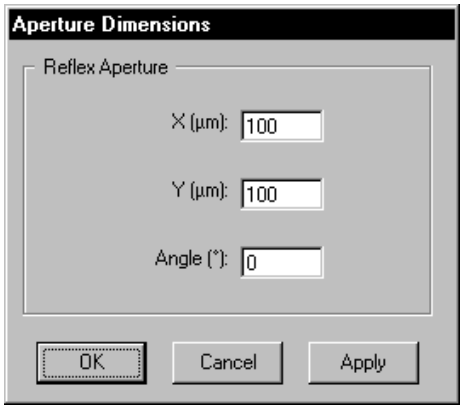
For more information about the Reflex aperture, see the documentation that came with your microscope.

Note You can also adjust the aperture graphically in the video pane. See "Adjusting the automated Reflex aperture on a Continuμm microscope" in the "The Atlμs Window" chapter for details. ▲

How to Focus the microscope automatically

1. **Choose Aperture Dimensions from the Continuμm menu.**

   The Aperture Dimensions dialog box appears.



2. **Specify the X dimension of the aperture in micrometers, before any rotation, by typing a number X (µm) text box.**

3. **Specify the Y dimension of the aperture in micrometers, before any rotation, by typing a number Y (µm) text box.**

4. **Specify the angle by which to rotate the aperture about the center of the field of view within the plane of the sample.**

   To do this, type a number in the Angle (degrees) text box. An angle of 0 positions the aperture with its X dimension parallel to the X-axis. You can rotate the aperture from 45 to -45 degrees (a negative angle rotates the aperture clockwise). With this range of rotation plus the ability to resize the aperture, any combination of orientation and rectangular shape is possible.

5. **Choose Apply to adjust the aperture as you specified without closing the dialog box.**

   This lets you make additional adjustments and see the results without having to choose the command each time. When you are satisfied with the aperture size, shape and orientation, choose OK.

Focusing the microscope automatically after moving the stage

Focus Settings...

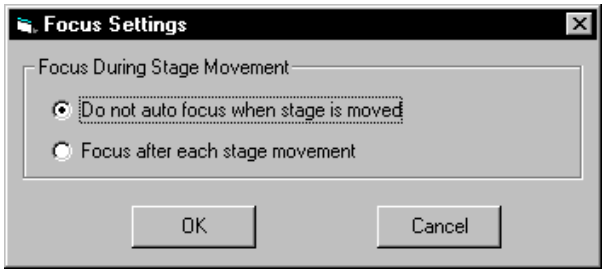
Use Focus Settings in the Stage menu (or Continuµm menu) to specify whether to focus the microscope automatically whenever you move the stage along the X-axis or Y-axis.

Note This command is available only if the optional autofocus equipment is installed. ▲

How to Focus the microscope automatically

1. **Choose Focus Settings from the Stage menu (or Continuμm menu).**

   The Focus Settings dialog box appears.



2. **If you want the microscope to be focused automatically, select Focus After Each Stage Movement.**

   If you do not want the microscope to be focused automatically, select Do Not Auto Focus When Stage Is Moved.

Note If you select Focus After Each Stage Movement, you will be able to use the autofocus option when capturing a Mosaic with Capture Mosaic in the Image menu. ▲

3. **Choose OK.**

Window menu commands

Use the commands in the Window menu to perform the operations listed in the following table.

To do this...	*Use this command...*
Keep the Atlµs window in front of other windows so that it is always visible.	Always On Top
Display the Atlµs and OMNIC windows in a "tile" pattern in which they fill the screen without overlapping, with the Atlµs window on top.	Arrange

Keeping the Atlµs window visible at all times

Always On Top

Use Always On Top in the Window menu of the Atlµs window to keep the Atlµs window in front of other application windows so that it is always visible.

How to

Keep the Atlµs window visible at all times

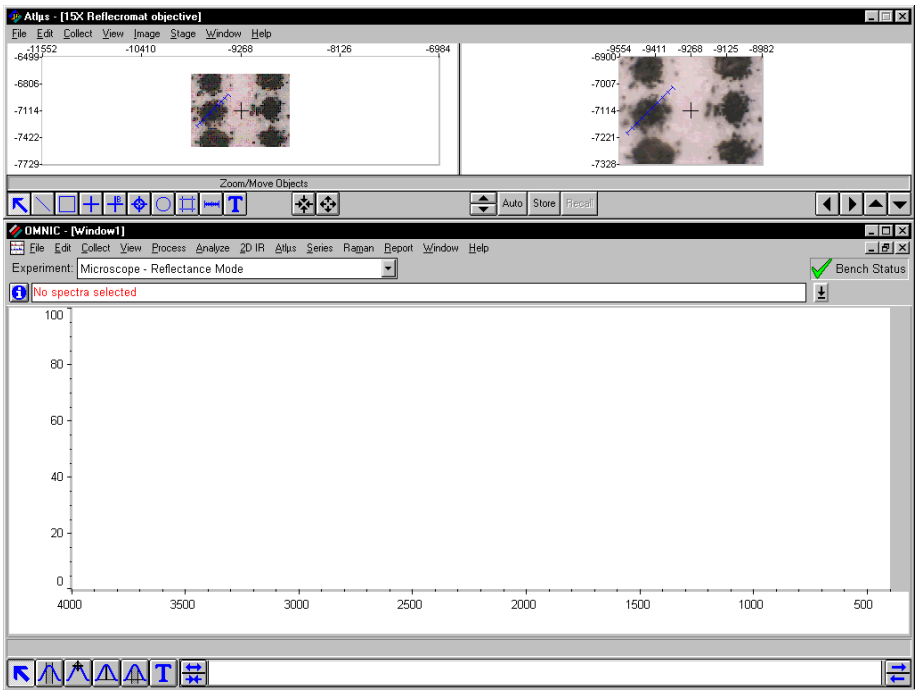
Choose Always On Top from the Window menu of the Atlµs window.

A check mark appears next to the command name to indicate that the command is on. If you choose the command again, the check mark is removed.

Arranging the windows

Arrange Ctrl+F6

Use the Arrange command in the Window menu of the Atlµs window to display the Atlµs and OMNIC windows in a “tile” pattern in which they fill the screen without overlapping, with the Atlµs window on top:



Atlµs and OMNIC windows after being arranged

➡ How to ➡

Arrange the windows

Choose Arrange from the Window menu of the Atlµs window.

The Atlµs and OMNIC windows are arranged on the screen for optimum viewing.

Help menu commands

The Help menu of the Atlµs window contains two commands: Contents and About Atlµs.

To find Help information about Atlµs features, choose Contents. See "On-line Help" in the "Introduction" chapter for details.

To display the software version number and copyright information and the current video rate in frames per second (if you are using the live video feature), choose About Atlµs. To close the dialog box that appears, choose OK.

6 Atlµs Menu Commands

The commands in the Atlµs menu of the OMNIC window allow you to collect and work with line and area map data. The primary use of each command is summarized in the following table:

To do this...	*Use this command...*
Open the Atlµs window in order to define a new map sequence or collect a map.	Show Atlµs Window
Open a map.	Open Map
Save a map.	Save Map As
View information about a map or change the map's title.	Show Map Info
Set the parameters for displaying map data.	Display Options
Display a saved Mosaic of video images for a sample area.	Show Video Mosaic
Apply a function to a map.	Apply Function
Reprocess the interferogram data for a map.	Reprocess Map
Save an area map profile as a CSV text file.	Save Profile As CSV Text

(continued on next page)

To do this...	*Use this command...*
View or print an enhanced 3-D display of the map data.	Enhanced 3-D Display
Truncate the spectral range of a map.	Truncate All Spectra
Extract a line map from an area map.	Extract Line Map
View, edit or create functional groups to use for creating a profile.	Edit Functional Groups
Split a map into separate spectral data files.	Split Map
Display Help information about the mapping features of Atlµs. (See "On-line Help" in the "Introduction" chapter for details.)	Atlµs Help Topics

The following sections describe in detail how to use these commands. For more general information on collecting and working with maps, see the "Overview" chapter. For information on the display features of map windows, see the "Map Windows" chapter.

Displaying the Atlµs window

If the Atlµs window is not open, use Show Atlµs Window in the Atlµs menu to open the window in order to define a new map sequence or collect a new map.

How to

Display the Atlµs window

Choose Show Atlµs Window from the Atlµs menu.

The Atlµs window appears, providing the tools and commands for specifying a map sequence or collecting a map. See “Using the tool palette” in the “The Atlµs Window” chapter and “Setting up data collection” in the “Atlµs Window Menus” chapter for more information.

Opening a map

Use Open Map in the Atlµs menu to open a line map or area map that is stored on a disk. You can then view and manipulate the map data.

How to

Open a map

1. **Choose Open Map from the Atlµs menu.**

   The Open dialog box appears listing the available map files, which have the extension .MAP.

2. **Type the name of the file you want to open, or locate and select a file.**

   You can change directories or drives to locate the file you want to open. If you select a file, the title of the map appears in the box at the bottom of the dialog box.

3. **Choose OK.**

   The map appears in a new map window.

Saving a map

Save Map As...

Use Save Map As in the Atlµs menu to save the active line map or area map on a disk. You can open the map later using the Open Map command.

➡ *How to* ➡

Save a map

1. **Make sure the map you want to save is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Save Map As from the Atlµs menu.**

   The Save As dialog box appears.

3. **Type a filename for the map in the File Name text box.**

   Use the extension .MAP.

4. **Select the directory where you want the map saved.**

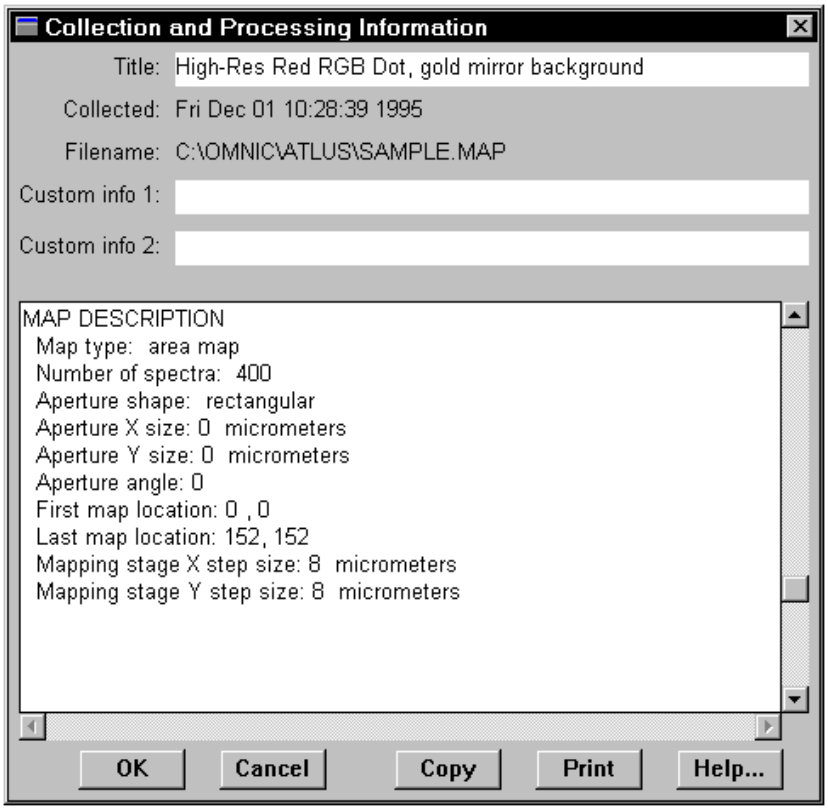
5. **Choose OK.**

Viewing information about a map

Show Map Info...

Use Show Map Info in the Atlµs menu to view a variety of information about the data in a map, including how the map was collected. You can also change the title of the map, enter comments about the map or copy or print the map information.

The map information is displayed in the Collection And Processing Information window. Here is an example showing the special mapping information scrolled into view:



This is the same window that appears when you click the Information button ("i") in a spectral window or double-click a spectrum title in the title box.

The title of the map is displayed in the Title box at the top of the window. You can edit the title just as you would a spectrum title. You can also type comments about the map in the Custom Info 1 and Custom Info 2 boxes. The Copy and Print buttons let you copy or print the map information.

For more information on using the Collection And Processing Information window, see the OMNIC Help system.

➡ *How to* ➡ View information about a map

1. **Make sure the map you want to view information about is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Show Map Info from the Atlμs menu.**

   The Collection And Processing Information window appears.

3. **To change the map title, edit the title directly in the Title text box.**

4. **To see information about the map, use the scroll bars to scroll the desired information into view.**

   You can copy all the information in the window to the Clipboard by choosing Copy. You can then paste the information using another Windows application that uses the Clipboard.

   You can print all the information on the default system printer by choosing Print.

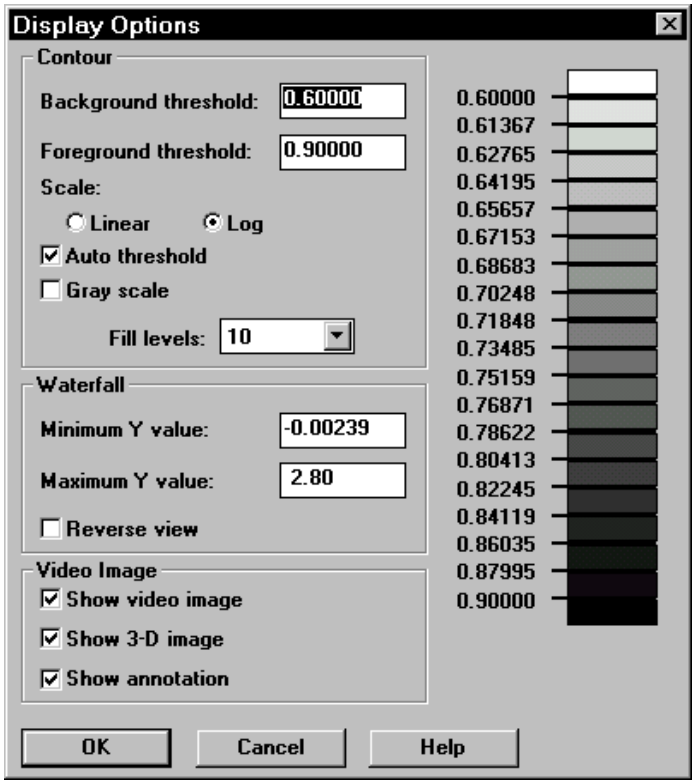
5. **When you are finished viewing the information, choose OK to close the window and save any changes you made, or choose Cancel to close the window without saving your changes.**

Setting the display options

Display Options...

Use Display Options in the Atlµs menu to specify how to display data in the active map window. Other map windows on the screen are not affected.

The display options are set in the Display Options dialog box:



The display options are located at the left side of the dialog box. To the right is a color key showing the ranges of values that will be represented by colors in the contour map. The color at the top of the key represents the lowest value. The color at the bottom represents the highest value.

The starting and ending values of the range for a color are displayed to the left of the color key. These values are determined by the settings of Background Threshold, Foreground Threshold and Scale.

The following table shows what you can specify with each display option:

To specify this...	*Set this option...*
The value that represents the minimum spectral intensity (for a line map) or profile value (for an area map).	Background Threshold
The value that represents the maximum spectral intensity (for a line map) or profile value (for an area map).	Foreground Threshold
Whether to use a linear or logarithmic scale for the values represented by contour colors.	Scale
Whether to automatically set the background and foreground threshold values when a contour map is calculated.	Auto Threshold
Whether to use shades of gray to represent spectral intensity or profile values in a contour map.	Gray Scale
The degree to which to add interpolated data points to an area map, thereby increasing the number of contours and making the change in contour value from one location to another appear more gradual.	Fill Levels

(continued on next page)

To specify this...	*Set this option...*
The minimum Y value to use for displaying waterfall data.	Minimum Y value
The maximum Y value to use for displaying waterfall data.	Maximum Y value
Whether to reverse the order in which waterfall spectra are displayed.	Reverse View
Whether to display a video image with contour data.	Show Video Image
Whether to display annotation in the video image.	Show Annotation
Whether to display a three-dimensional image of the map data.	Show 3-D Image

The following sections describe the display options in detail. The step-by-step procedure that appears later in the "Setting the display options" section explains how to set each of these options.

Contour options

This section explains the options available in the Contour box.

Setting the background and foreground thresholds

The Background Threshold and Foreground Threshold options determine the low and high limits of the displayed value range. The Background Threshold value represents the minimum spectral intensity (for a line map) or profile value (for an area map). This value will appear at the top of the color key's numerical scale. The Foreground value represents the maximum spectral intensity (for a line map) or profile value (for an area map). This value will appear at the bottom of the color key's numerical scale.

If you want the background and foreground thresholds set automatically, use Auto Threshold. See “Setting the threshold values automatically” for details.

Selecting a linear or logarithmic scale

The Scale options determine whether the scale used for the values represented by contour colors is linear or logarithmic. In a linear scale the difference between consecutive values, or the “contour interval,” is a constant for the entire range of values. In a logarithmic scale the contour interval increases as you move from low to high values in the range. This makes it easier to see small variations in value in the low-value areas of the map. To use a linear scale, select Linear; to use a logarithmic scale, select Log.

Setting the threshold values automatically

Turn on Auto Threshold if you want the background and foreground thresholds automatically adjusted for optimum viewing whenever you perform any of the following operations:

- Apply a function to a map using Apply Function in the Atlµs menu.
- Reprocess a map using Reprocess in the Atlµs menu.
- Truncate the spectral range of a map using Truncate All Spectra in the Atlµs menu.
- Create an area map profile using the Profile button in a map window.

Note If you use Display Options in the Collect menu of the Atlµs window to turn on Auto Threshold before collecting a map, the thresholds are automatically adjusted when the initial contour map is calculated and displayed in a map window. ▲

Displaying values as shades of gray

Turn on Gray Scale if you want shades of gray used to represent spectral intensity values (in a line map) or profile values (in an area map). When this option is on, the color key displays a range of gray shades, with white as the lightest shade at the top (background value) and black as the darkest shade at the bottom (foreground value).

This feature is useful for printing contour maps on a black-and-white or gray-scale printer. Since the values increase as the gray shades become darker, it is easy to identify areas of relative low and high value on the printed map. If you print a colored contour map on the same printer, however, the darkness of the resulting printed gray shades will not necessarily correlate with the values. A color that represents a high profile value, for example, may appear as a light gray on paper. See "Step 6: Print the map (optional)" in the "Overview" chapter for more information on printing the contents of a map window.

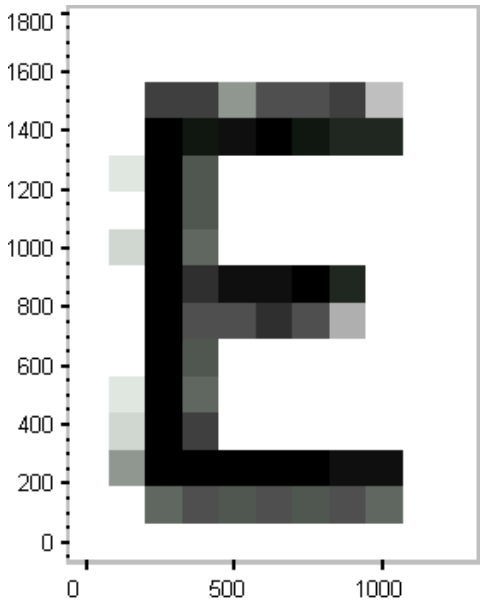
Interpolating area map data

You can use Fill Levels to "fill" an area map with interpolated data points. The software adds between each data point the number of interpolated data points you have specified with Fill Levels. This increases the number of contours in the displayed contour map, making the change in contour value from one location to another appear more gradual and smoothing the edges of shapes in the map.

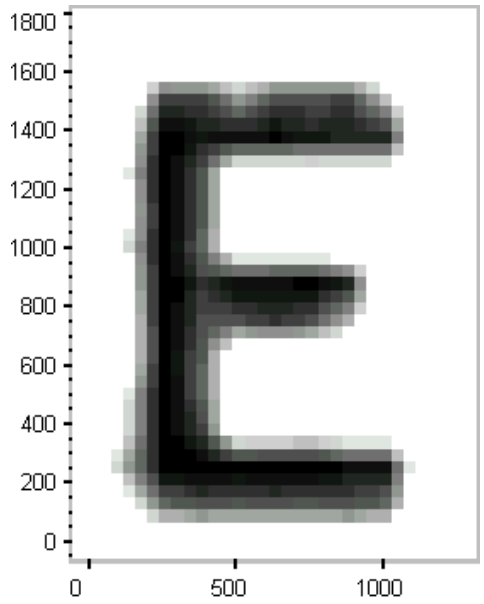
Adjusting the number of fill levels can be useful in chemical analyses, such as monitoring concentration gradients. You can also use this feature to improve the appearance of a map for a presentation.

To display a map without interpolation, set Fill Levels to 0.

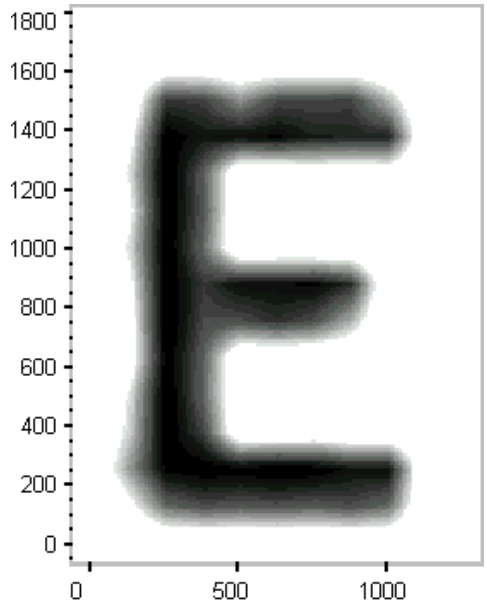
The following illustrations show a contour map before interpolation and after interpolation with two fill levels and ten fill levels. Notice that the number of contours is increased by interpolation, resulting in a more gradual transition from one location to another.



Before interpolation



After interpolation with two fill levels



After interpolation with twelve fill levels

Keep in mind that interpolating the data merely improves the appearance of the map; no additional information about the sample is added. Also, the interpolated map may be less accurate in some places, since an interpolated data point would not necessarily reflect the actual profile value at the corresponding location on the sample, if you were to measure it. For this reason, it's a good idea to indicate that the map has been interpolated by stating it in the map title. See "Viewing information about a map" for details on editing a map title.

Waterfall options

This section explains the options available in the Waterfall box.

Setting the minimum and maximum Y values

The Minimum Y Value and Maximum Y Value options determine the Y range of the displayed waterfall data. Enter intensity values that are appropriate for the format of the data.

Reversing the view of the waterfall data

Spectra in a waterfall are normally displayed with the spectrum collected most recently at the back of the waterfall (the highest position on the screen). If you want this order reversed, turn on Reverse View.

Video Image options

This section explains the options available in the Video Image box.

Displaying the video image

Turn on Show Video Image if you want a video image of the sample to be displayed to the right of the spectral display pane in the map window. The pane will be resized to make room for the video image. This feature requires the optional video capability.

If the video image is displayed when you use Print in the File menu to print the contents of the map window, the image is included in the printed items. (See "Step 6: Print the map (optional)" in the "Overview" chapter for more information on printing the contents of a map window.) Similarly, if the image is displayed when you use Copy in the Edit menu to copy the contents of the map window to the Clipboard, the image is included and will be included if you paste the contents into a document using a word processor.

Displaying annotation in the video image

Turn on Show Annotation if you want map annotation to be displayed in the video image. Map annotation can consist of a drawn line map or area map, or cross hairs at the sample points of an area map.

If annotation is displayed in the video image when you print the contents of the map window, the annotation will appear in the printout.

Displaying the 3-D image

If you are setting the display options for an area contour map, you can turn on Show 3-D Image to display a three-dimensional representation of the map data. See "Using the 3-D display" in the "Map Windows" chapter for complete information on using the 3-D display.

If the 3-D image is displayed when you use Print in the File menu to print the contents of the map window, the image is included in the printed items. (See "Step 6: Print the map (optional)" in the "Overview" chapter for more information on printing the contents of a map window.) Similarly, if the image is displayed when you use Copy in the Edit menu to copy the contents of the map window to the Clipboard, the image is included if you paste the contents into a document using a word processor.

➡ *How to* ➡ Set the display options

1. **Make sure the map window for which you want to set the display options is active.**

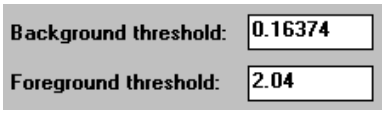
   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Display Options from the Atlμs menu.**

   The Display Options dialog box appears.

3. **Set the display options.**

   Specify the Background Threshold and Foreground Threshold values by typing the desired values in the text boxes:



   Specify the kind of scale to use for intensities represented by the map colors by selecting Linear or Log:

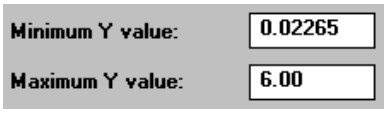
Turn on Auto Threshold if you want the threshold values to be adjusted automatically for optimum viewing whenever you apply a function to a map using Apply Function, reprocess a map using Reprocess, truncate the spectral range of a map using Truncate All Spectra, or create an area map profile using the Profile button.

Turn on Gray Scale if you want shades of gray used to represent spectral intensity values (in a line map) or profile values (in an area map).

Specify the number of fill levels to use for interpolating the map data (if you are displaying an area map) by selecting a value from the Fill Levels drop-down list box:

To display the map without interpolation, set Fill Levels to 0.

Specify the Y display range for the waterfall (if you are displaying a line map) by typing the desired values in the Minimum Y Value and Maximum Y Value text boxes:



If you want waterfall spectra displayed with the most recently collected spectrum at the front of the waterfall (lowest position on the screen), turn on Reverse View:

Turn off Reverse View if you want to use the normal display, with the most recently collected spectrum at the back of the waterfall (highest position on the screen).

If you want a video image displayed with the contour data, turn on Show Video Image:

If you want annotation displayed in the video image, turn on Show Annotation:

If you are setting the display options for an area contour map and want a 3-D image of the map data displayed to the right of the map, turn on Show 3-D Image:

4. **When you are finished setting the display options, choose OK.**

Tips Setting the display options

- Before creating a Functional Group or Correlation Map profile, set Scale to Linear, turn off Auto Threshold, and set Background Threshold to 0 and Foreground Threshold to 1. See "Creating a profile" in the "Map Windows" chapter for information on creating profiles.

- Set the Y-axis display limits of the waterfall (Minimum Y value and Maximum Y value) so that strong bands will not be clipped when displayed.

Displaying a stored Mosaic

Show Video Mosaic...

If you specified that the video images be saved before collecting a map, you can use Show Video Mosaic in the Atlμs menu to display a Mosaic of these images in a Video Mosaic window. Here is an example:

With buttons provided in the window, you can enlarge the Mosaic to see fine detail or print the Mosaic on paper.

Note This Mosaic is not the same Mosaic that you can capture using Capture Mosaic in the Image menu of the Atlµs window (although it could show nearly the same area of the sample). This Mosaic is assembled from the video images that are saved before map data collection if Save Video Frames In Map File is turned on in the Map Setup dialog box. ▲

For information on saving the video images before collecting a map, see "Options" in the "Atlµs Window Menus" chapter.

➡ *How to* ➡ Display a stored Mosaic

1. **Make sure the map window containing the map for which you want to display the Mosaic is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Show Video Mosaic from the Atlµs menu.**

   The Mosaic appears in a Video Mosaic window.

   If you want to enlarge the Mosaic, choose Zoom In. You can choose Zoom In again to enlarge the Mosaic further. When needed, scroll bars appear at the right side and bottom of the window to allow you to scroll portions of the Mosaic into view. To return the Mosaic to its former size, choose Zoom Out.

   If you want to print the image, choose Print. The Print button is available only when the Mosaic is displayed at its original size.

3. **When you are finished using the Video Mosaic window, choose Close.**

Applying a function to a map

Apply Function...

Use Apply Function in the Atlμs menu to apply one of the functions described in the table below to the data in the active map. For a description of the standard OMNIC feature on which the function is based, see the OMNIC Help system. (The Add Constant function is not based on a standard OMNIC feature.) The Raman-related functions are described in the OMNIC For Raman Help system.

Note Only the functions that are appropriate for your data format are available. ▲

Important The effects of applying a function to a map are saved in the map file. Therefore, we recommend that you apply functions to a copy of the map data unless you are sure that you want to change the original data permanently. ▲

To do this...	*Select this function...*
Convert a map to absorbance.	Absorbance
Convert a map to % transmittance.	%Transmittance
Convert a map to % reflectance.	% Reflectance
Convert a map to log (1/R) units.	Log (1/R)
Convert a map to Kubelka-Munk units.	Kubelka-Munk
Correct the baselines of map spectra automatically.	Auto Baseline Correction
Correct ATR map data for pathlength variations.	ATR Correction
Correct map data for dispersion effects.	Dispersion Correction
Remove water peaks from map spectra.	H2O Correction
Remove carbon dioxide peaks from map spectra.	CO2 Correction

(continued on next page)

To do this...	*Select this function...*
Remove water and carbon dioxide peaks from map spectra	H2O And CO2 Correction
Erase the specified spectral region of the map spectra.	Blank
Replace the specified spectral region of the map spectra with a straight line.	Straight Line
Smooth sharp peaks in map spectra using a specified number of smooth points.	Smooth
Smooth sharp peaks in map spectra automatically.	Automatic Smooth
Convert a map to the first derivative.	First Derivative
Convert a map to the second derivative.	Second Derivative
Multiply the map spectra by a specified constant.	Multiply By Constant
Add the specified constant to the Y value of every data point in map spectra.	Add Constant
Subtract a spectrum from the map spectra.	Scaled Subtraction
Convert a map to Raman shift.	Raman Shift
Unshift the Raman data.	Raman Unshift
Shift a map using a specified laser frequency.	Custom Shift

How to Apply a function to a map

1. **Make sure the map you want to apply the function to is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **If you plan to apply the Blank function or Straight Line function and want to specify the spectral region graphically, use the region tool to select the spectral region.**

   You may need to adjust the display first using the view finder or other techniques in order to see the desired region.

   If you are working with an area map, select a region in the spectral display pane at the top of the map window. If you are working with a line map, you can select the region in the pane or in the contour map.

   If you don't select a spectral region using the region tool, you can enter the region limits later in this procedure.

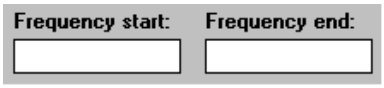
3. **Choose Apply Function from the Atlμs menu.**

   The Apply Function dialog box appears:

4. **Select the desired function from the drop-down list box near the top of the dialog box.**

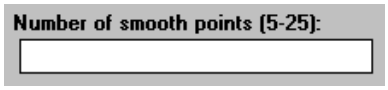
   Depending on the function you select, one or two text boxes may appear allowing you to enter the needed information.

   Blank or **Straight Line** – Two text boxes appear allowing you to enter the starting and ending frequencies of the spectral region to be blanked or replaced by a straight line:



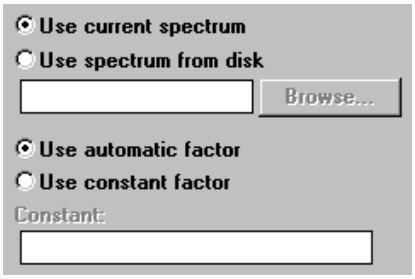
   Smooth – A text box appears allowing you to enter the number of smooth points:

You can enter any odd number from 5 to 25.



   Multiply By Constant or **Add Constant** – A text box appears allowing you to enter the constant by which to multiply the map spectra, or to add to the Y value of each data point in the spectra:

Scaled Subtraction – Several parameters become available for specifying the spectrum to subtract from each map spectrum and the subtraction factor:

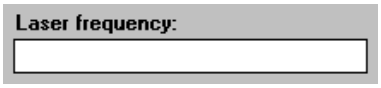


- If you want to subtract the spectrum displayed in the spectral display pane of the map window, select Use Current Spectrum.
- If you want to subtract another spectrum stored on a disk, select Use Spectrum From Disk. Then type the pathname of the desired spectrum in the text box, or choose Browse and locate and select a spectrum in the dialog box that appears.

The specified spectrum will be multiplied by a subtraction factor before being subtracted from the map spectra. This allows you to compensate for unequal spectral intensities in the specified spectrum and the map spectra, giving better subtraction results.

- To use a subtraction factor that is calculated automatically, select Use Automatic Factor.
- To use a constant factor that you specify, select Use Constant Factor and then type the desired factor in the Constant text box.

Custom Shift - A text box appears allowing you to enter the laser frequency:



5. **Enter any information required for the function you selected.**

   If you used the region tool to select a spectral region for the Blank function or Straight Line function, you can use the frequency limits shown or enter new limits.

6. **Choose OK.**

   The selected function is applied to the map, and the results appear in the map window.

➡ *Tips* ➡ Applying a function to a map

- Correcting the baselines of map spectra (with Auto Baseline Correction) is a good way to compensate for a variety of factors that can alter baseline response (for example, scatter and sample focus). You may find that the profiles you create using baseline-corrected data more closely correspond to the visible image.

Reprocessing a map

Reprocess Map...

Reprocess Map in the Atlµs menu lets you transform the interferogram data for a map using different transform parameter settings or ratio the map spectra against a different background in order to improve the final data. You can use any stored background spectrum and change the settings of any of the following parameters:

- Resolution
- Apodization
- Zero Filling
- Final Format
- Correction
- Spectral Range

These parameters are explained in detail in the OMNIC Help system.

Only maps collected using interferograms as the final format can be reprocessed.

How to

Reprocess a map

1. **Make sure the map you want to reprocess is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Reprocess from the Atlµs menu.**

   The Reprocess dialog box appears showing the current settings of the transform parameters. See the OMNIC Help system for complete information on using this dialog box.

3. **If you want to change the setting of a parameter, select a setting from the drop-down list box to the right of the parameter name.**

   You can select a resolution that is less than or equal to that of the original spectrum.

4. **If you want to reprocess the spectra using a different background, choose Browse.**

   In the dialog box that appears select a background file from any available directory or drive and then choose OK.

5. **When the parameters and background file are set the way you want them, choose OK to reprocess the map.**

Saving an area map profile as a CSV text file

Use Save Profile As CSV Text in the Atlµs menu to save all the profile data of an area map as a CSV (comma-separated values) text file. You can open the saved file later using an application that opens CSV files.

Note To save a profile created from a line map as a CSV file, use Save As in the File menu of the OMNIC window. If you want to save just a portion of the profile, first use the region tool to select the desired portion. See "Creating a profile" in the "Map Windows" chapter for information on creating a profile from a line map. See the OMNIC Help system for details on saving the data as a CSV text file. ▲

How to Save an area map profile as a CSV text file

1. **Make sure the area map profile you want to save is active.**

   You can make an area map profile (area contour map) active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Save Profile As CSV Text from the Atlµs menu.**

   The Save As dialog box appears.

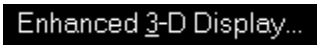
3. **Type a filename in the File Name text box.**

   Use the file extension .CSV.

4. **Select the directory where you want the profile saved.**

5. **Choose OK.**

Using the enhanced 3-D display



Use Enhanced 3-D Display in the Atlµs menu to view your map data in an enhanced three-dimensional display that shows the axes. You can manipulate the display and print it on paper.

Note You can also view a three-dimensional display of area map data within a map window. See "Using the 3-D display" in the "Map Windows" chapter for more information. ▲

➡ *How to* ➡

Use the enhanced 3-D display

1. **Make sure the map window is active.**

   You can make the window active by clicking it or by choosing its title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Enhanced 3-D Display from the Atlµs menu.**

   The GRAMS/3D® software starts and a window appears containing a three-dimensional display of the map data. See the manual that came with the GRAMS/3D software for details on how to manipulate or print this display.

   To exit the enhanced three-dimensional display, close the window.

➡ *Tips* ➡

Using the enhanced 3-D display

- Different types of three-dimensional display are available. To select one, use the Gallery command in the View menu of the GRAMS/3D software.

Truncating the spectral range of a map

Truncate All Spectra...

Use Truncate All Spectra in the Atlµs menu to permanently delete from a map all the spectral data outside a spectral region that you specify.

If you think you may need the deleted data later, save the map using a different name before you truncate the spectral range.

➡ *How to* ➡ Truncate the spectral range of a map

1. **Make sure the map you want to apply the function to is active.**

   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

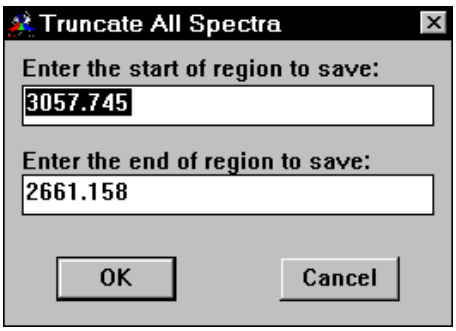
2. **If desired, use the region tool to select the spectral region you want to retain.**

   Select the spectral region in the pane at the top of the map window. If you don't select a spectral region using the region tool, you can specify the region limits in the Truncate All Spectra dialog box later in this procedure.

3. **Choose Truncate All Spectra from the Atlµs menu.**

   The Truncate All Spectra dialog box appears:

If you selected a spectral region in the preceding step, the limits of the region appear in the text boxes.



4. **Type the region limits you want to use in the text boxes, or make any desired changes to the displayed limits.**

5. **Choose OK.**

   The spectral data outside the specified spectral region are deleted from the map. This can take several minutes.

Tips Truncating the spectral range of a map

- You can use Truncate All Spectra to isolate spectral regions having relatively high signal-to-noise ratios (SNR). If the SNR is poor, it will be poorest at the low-wavenumber end of the spectral range. You can eliminate that portion of the range by truncating the map spectra. If you fail to eliminate bad data from the map, misleading profiles may result, especially if the map has been baseline-corrected.

Extracting a line map from an area map

Extract Line Map...

Use Extract Line Map in the Atlμs menu to create a new line map from spectra contained in an area map. You first draw a line across the displayed area contour map or video image (or enter the endpoints of the line). The spectra whose contours or sample points are closest to the line are then used to create the new map.

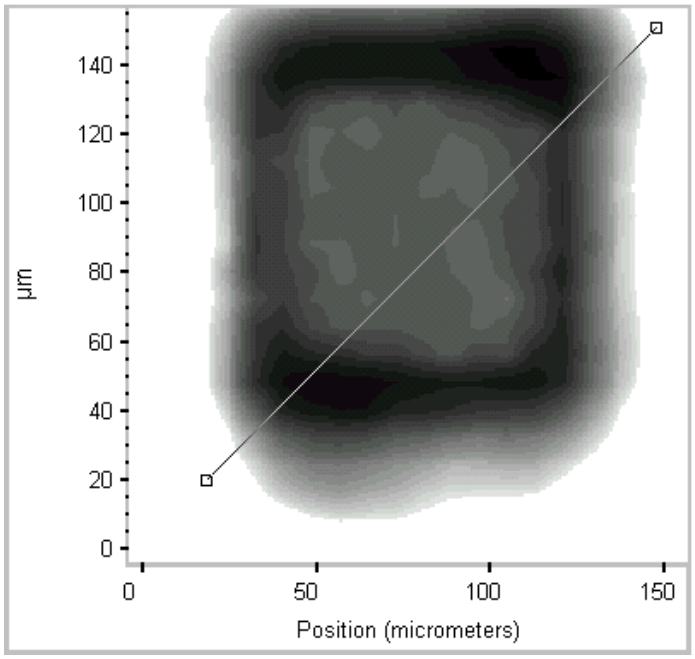
How to

Extract a line map from an area map

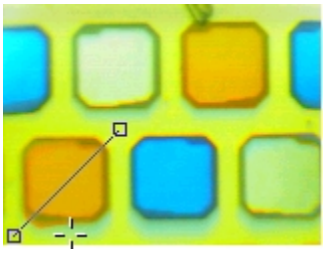
1. **If desired, use the extraction tool to draw a line across the area contour map or video image.**

   Here is an example of a line drawn across an area contour map:

This is much like drawing a line across the sample that was used to collect the area map.



Here is an example of a line drawn across a video image:



Depending on how you draw the line, the actual sample points in the new map may be located somewhat off the line.

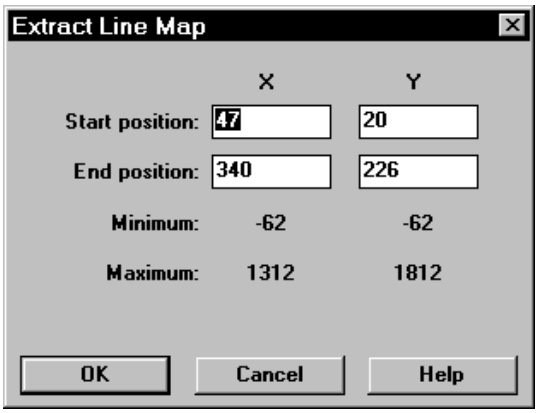
If you don't draw a line, you can specify the endpoints of the line in the Extract Line Map dialog box later in this procedure.

Note You can extract the line map without using the Extract Line Map command. Just double-click an endpoint of the line you drew with the extraction tool. ▲

2. Choose Extract Line Map from the Atlµs menu.

The Extract Line Map dialog box appears:

If you drew a line with the extraction tool, the X and Y values of the start and end of the line appear in the X and Y text boxes.



The minimum and maximum X and Y values of the map data appear below the text boxes. The X and Y values of the start and end of the line must be within this range of values.

3. **Type the X and Y values you want used for the line endpoints in the text boxes, or make any desired changes to the displayed values.**

4. **Choose OK.**

   The line map is calculated and displayed in a new map window.

Viewing, editing or creating functional groups

Edit Functional Groups...

functional group 1) A group of two or more bonded atoms that exhibit a distinctive chemical property. 2) A profile type that shows the locations of a chemical functional group on a sample.

Use Edit Functional Groups in the Atlμs menu to view, edit or delete existing user-defined functional groups or create new functional groups to be used for creating profiles.

When you specify the spectral regions for a functional group, you also specify a weighting factor for each region. The weighting factor determines the degree to which a region influences spectral differentiation. Using a weighting factor for each region is necessary, since many functional groups have more than one absorption band that can be used to confirm the group's presence in a sample. Assign a larger weighting factor to regions that are more helpful in differentiating the group from other groups.

After you create a functional group, it becomes available for your selection when you set up a profile with the Profile Setup button. See "Creating a profile" in the "Map Windows" chapter for details on creating profiles.

➡ *How to* ➡ View, edit or create functional groups

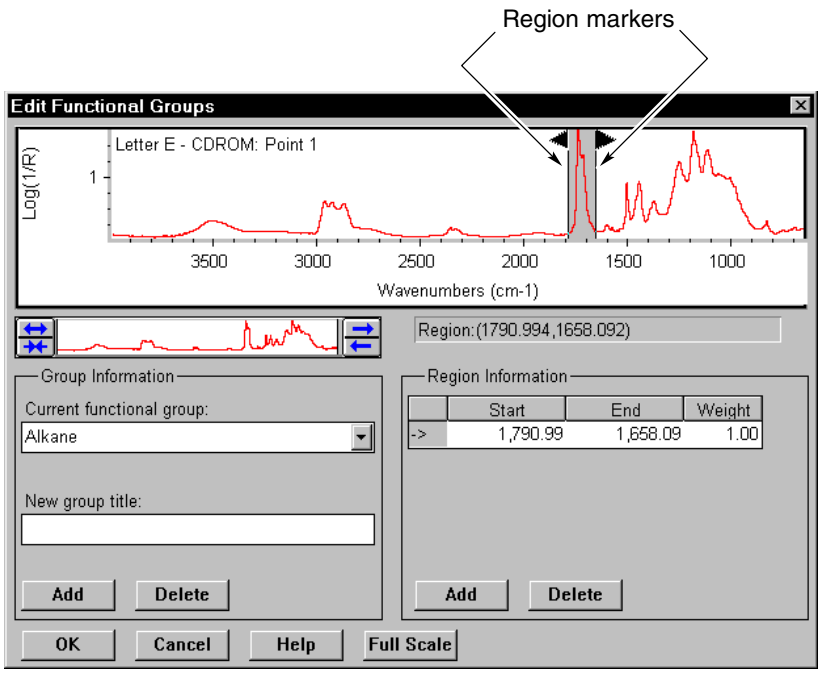
1. **Display a spectrum of a compound that contains one or more functional groups of interest.**

   Displaying a spectrum that contains bands caused by the functional groups can help you specify the spectral regions for the groups graphically. (You will also be able to specify the regions by typing their numerical region limits.)

   To display a spectrum, click an appropriate location in the contour map using the spectral cursor tool. The spectrum appears in the spectral display pane of the map window.

2. **Choose Edit Functional Groups from the Atlµs menu.**

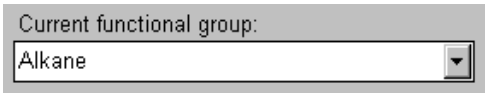
The Edit Functional Groups window appears with the spectrum in the pane near the top of the window.



The Region Information box contains a table showing the frequency limits of the spectral regions currently specified for the functional group indicated by the Current Functional Group drop-down list box. If you click a row of the table, the spectral region specified by that row is indicated in the pane by a shaded area between two vertical region markers. An arrow near the left edge of the table shows which spectral region is currently indicated in the pane. When needed, a scroll bar is provided for scrolling rows of the table into view.

Each spectral region has a weighting factor, shown in the Weight column of the table.

3. **To view the region information for a particular functional group, select the group from the Current Functional Group drop-down list box.**



4. **If desired, edit the region information for the current functional group.**

   To do this, click the row of the table that specifies the spectral region you want to change and then drag the handles of the region markers in the pane to the desired frequency limits. The X values of the marker locations appear in the readout below the pane to help you position the markers precisely.

   You can also specify a region limit by clicking the current limit in the table, typing a new value and then pressing Enter.

   You can change the view of the spectrum to see a region more clearly by using the view finder below the pane. (See the OMNIC Help system if you need information on using the view finder.) If you want to display the spectrum “full scale” so that it fills the pane vertically, click the Full Scale button at the bottom of the window.

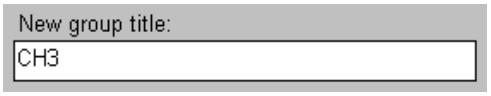
   If you want to change the weighting factor for a region, click the factor in the table, type a new value and then press Enter.

   You can add a spectral region to the table by clicking the Add button in the Region Information box. A row is added to the bottom of the table. Edit the region limits and weighting factor in the row as described above.

You can delete an entire spectral region specification by clicking its row in the table and then clicking the Delete button in the Region Information box.

5. **If desired, create one or more new functional groups.**

   To create a group, first type a title for the group in the New Group Title box.



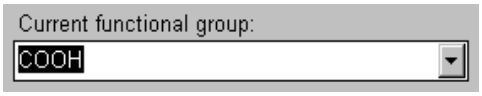
   Then click the Add button in the Group Information box. The new title appears in the Current Functional Group drop-down list box.

   Specify the spectral regions for the group and their weighting factors by using the editing methods described above.

   You can delete an entire functional group specification by selecting the group from the Current Functional Group drop-down list box and then clicking the Delete button in the Group Information box.

6. **If desired, change the title of one or more functional groups.**

   To edit a title, first select the group whose title you want to change from the Current Functional Group drop-down list box. The title text is automatically selected and ready to change.



   Type a new title or use standard techniques to edit the title text.

7. **When you are finished viewing or specifying the functional groups and their spectral regions, choose OK.**

Splitting a map into spectral data files

Split Map...

Use Split Map to split a line map or area map, or just a portion of the map, into separate spectral data files. The new files are created by copying the specified portion of the map; the original map remains intact on the disk.

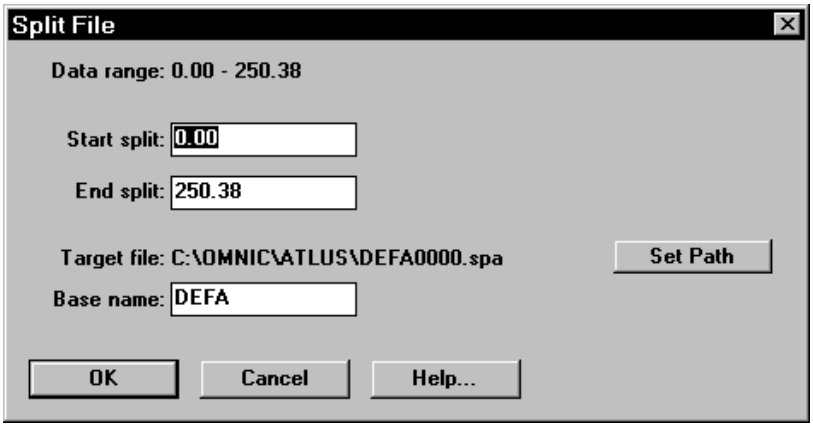
➡ *How to* ➡ Split a map

1. **Make sure the map you want to split is active.**

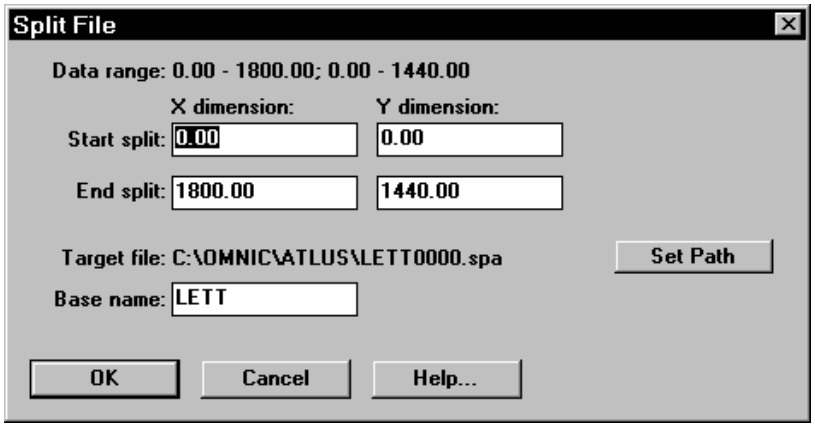
   You can make a map active by clicking anywhere in its window or by choosing its window title from the Window menu. A check mark appears to the left of the title in the menu when the map is active.

2. **Choose Split Map from the Atlµs menu.**

   The Split File dialog box appears. If you are splitting a line map, the dialog box looks like this:



If you are splitting an area map, the dialog box looks like this:



For a line map, the Data Range values indicate the range of the X dimension of the data in the map, in micrometers. For an area map, the Data Range values indicate the ranges of the X and Y dimensions of the data in the map, respectively.

3. **Specify the starting and ending values of the portion of the map you want to split by typing values in the Start Split and End Split text boxes.**

   For a line map, type the starting and ending X values. For an area map, type the starting and ending values for both the X and Y dimensions.

4. **Type a base name for saving the spectral data files in the Base Name text box.**

   The pathname that will be used for saving the files is shown to the right of Target File. The filename at the end consists of the specified base name, a four-digit number that will increase by one for each successive file saved, and an extension. Enter a unique, descriptive base name of up to four characters that will help you identify the files later.

5. **Specify the directory location where the map is located.**

   To do this, choose Set Path. The Select Path dialog box appears. Locate and select the directory. You can use the Network button to add a drive to the list box of directories.

6. **Choose OK.**

   The map is split into separate spectral data files, which are stored in the specified directory. This may take several minutes. After the map is split, a dialog box appears showing where the last spectral data file (and the preceding files) has been saved.

7. **Choose OK.**

   After you finish this procedure, you can start working with the new spectral data files using the features of OMNIC. For example, to open one of the new files, use Open in the File menu.

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